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ABSTRACT

This compendium deals with the ecology and economic importance of the poplars, willows, hickories, birches, beeches, oaks, elms, nettles, sorrels, docks, and smartweeds growing in New York's Catskills. Provided are keys for identifying each plant to species by flowers, foliage, or winter buds. A line drawing accompanies a summary of basic data concerning each species' habitat, range, growth habit, origin, and flowering time. In addition, maps and annotations delineate species distribution by Catskill township. Also discussed for each plant are uses in medicines and dyes, as food for humans and livestock, in construction, and for other purposes. (WB)

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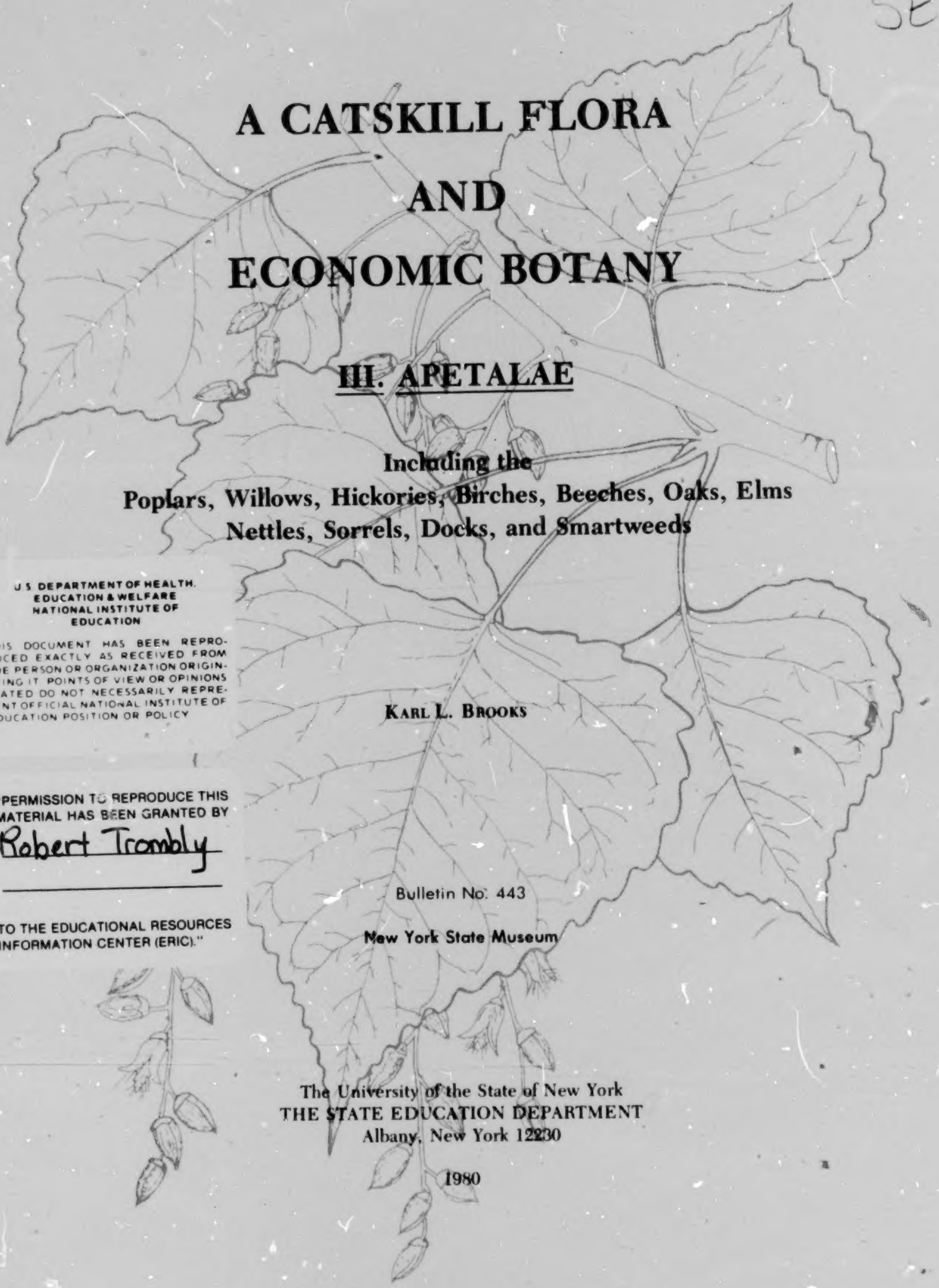

A CATSKILL FLORA AND ECONOMIC BOTANY

III. APETALAE

Including the
Poplars, Willows, Hickories, Birches, Beeches, Oaks, Elms
Nettles, Sorrels, Docks, and Smartweeds

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Bulletin No. 443

New York State Museum

The University of the State of New York
THE STATE EDUCATION DEPARTMENT
Albany, New York 12230

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EDITOR'S PREFACE

This is the work of an amateur botanist whose many years of collection and study of Catskill plants make him the person most qualified to produce such a treatment in the tradition of the old herbals. We at the Botany Office of the New York State Museum feel that this type of publication is a useful adjunct to our efforts to produce a comprehensive state flora. The author's intimate knowledge of the area and its plants makes this a valuable work for those who are native to the Catskills, as well as for the many summer visitors. Medical and food uses of plants, though often only of historical interest, round out the treatment, and make this publication what it is intended to be--a source book for those interested in reading and learning about the Catskill flora. Indeed, since the vast majority of the plants discussed are widely distributed throughout the northeastern states and adjacent Canada, this work should also be of interest far beyond the narrow confines of the Catskill region.

IMPORTANT NOTE

All economic uses, folklore, medical and pharmaceutical notes, uses as foodstuffs, etc., are compiled from the literature and do not represent an endorsement by the author or the New York State Museum. Some of the uses may, indeed, be dangerous if incorrectly employed. Some are not effective and are presented for historical interest only.

PREFACE

The Catskills have long been known for their unusual beauty, healthful climate, and their natural resources for recreation, not the least of which is their abundant wildlife and in some respects a unique flora. While it is true that a large percentage of the plants growing naturally in the Catskills also occur throughout most of the northeastern states and adjacent Canada, many species are rare, only locally abundant, or do not occur elsewhere in the eastern states. Some are northern elements found only on the high peaks, and others appear to have been stranded in isolated areas following the retreat of the last glacier some 10,000 years ago. But whether rare in distribution or more abundantly widespread, no plant is completely devoid of interest, and many have had a long and varied association with man that goes back over many millennia.

A study of the flora of any region can be a richly rewarding experience, and that of the Catskills is no exception. Simply getting to know what plants grow in a particular area brings one closer to an understanding of the wonders of nature, but it has long been my contention that just knowing a plant by name is only the beginning. What is its relationship to other plants, both wild and cultivated? Of what value is it to man and to wildlife? Is it edible, a source of dye, useful as a medicine, or is it just an obnoxious weed? How can it be prepared for the table? For what was it prescribed? How can one get rid of it? Answers to such questions not only lead us down many intriguing paths, but also contribute much to our understanding of the intricacies of the biosphere.

My work on the Catskill flora during the last three decades has therefore had a three-fold objective: (1) to determine precisely what species grow in this area, (2) to chart the known distribution of each species in the Catskills, and, (3) for each, to collect as much information as possible concerning its value to man and to wildlife. These objectives have led to many hours of work in the field collecting specimens and making observations of the plants seen, plus countless others in libraries and herbaria to obtain information on their distribution and use.

This work was written primarily for the serious amateur with a desire to know more about the plants growing in the northeastern states and adjacent Canada, with particular emphasis upon those occurring in the Catskills. In these times of increasing concern for man's impact upon the environment, the dwindling food supply in relation to increased population pressure throughout the world, inflation, and the rising desire of a large segment of the people to return to fundamentals, as it were, it is hoped that the emphasis given to economic botany, and to the importance of our native flora to wildlife, will fill a basic need. So far as the writer is aware, this is the first time that detailed information on food, drug, and dye plants has been assembled in a compilation that includes the common weeds as well as the more obscure components of our flora such as the grasses and sedges, which most popular field guides ignore completely.

In addition, "plant biographies" summarizing basic data concerning the name, type of plant, range, distribution, origin, and time of flowering (or fruiting) are provided for each plant occurring in the Catskills, together with some remarks on other salient facts of the plants in question. Detailed distribution maps showing by township the localities where each species has been observed are supported by data culled from the literature and an examination of herbarium specimens, in addition to many thousands of observations in the field. The citation of observations is a comparatively recent innovation in helping to determine the distribution of the many species making up our flora; in addition, so far as the writer is aware, never before have photographs been cited as evidence for the occurrence of a particular species in any given area, thus placing them almost on a par with herbarium specimens. In view of the number of rare and endangered species now stringently protected by law, this practice is likely to attain increased importance. These data, together with the keys, illustrations, and detailed notes on each of the various species, should help the serious student not only to identify the plants in question, but to provide the basic knowledge that will enable him to view the plant world as a vital part of the planet on which he lives.

In collecting and organizing this information, the writer has attempted to proceed from the general to the more specific, starting with the orders into which the various plant families are organized, then presenting some ideas on their evolution and possible relationships to each other, together with comments on both wild and cultivated plants, in the hope that such an overview will provide a more meaningful picture of each group of plants. The families making up each order of the Catskill flora are then presented (in "manual" order), with an attempt to relate any cultivated plants in that family to their wild cousins before going on to a discussion of the wild species themselves. Where possible, information on their economic value to man and to wildlife has been supplied. With few exceptions, genera are arranged alphabetically under families, and species are arranged alphabetically under genera. To aid in the identification of the various species, keys to genera and species are included, and illustrations of the various species have been chosen with considerable care.

Some may object that such an accumulation of material is not truly a flora, but that is a matter of definition. In any case, such a study is not only its own reward, but a knowledge of the world of plants and their relationships to wildlife and to man, not to mention an enjoyment of the natural world as opposed to the artificial concrete jungles of our modern cities, brings a perspective not to be attained in any other way. This may perhaps seem to be getting far afield, but all the world is an intricately balanced biosphere, and man must not only understand its complexities, but must also be able to accommodate himself to its demands if he, himself, is to survive as a species.

A work of this nature could not have been completed without the help and encouragement of a number of people. My wife, Marguerite, has borne the brunt of my numerous idiosyncrasies, both as a constant companion in the field and as a demanding editor and critic. The late Stanley J. Smith, curator of botany at the New York State Museum, not only spent countless hours checking my specimens and graciously permitted access to the state's records on plant distribution, but has also been mentor and companion in the field on many occasions, to say nothing of his continuing advice and encouragement for over a quarter of a century. In addition to supplying moral support and companionship in the field, Paul Huth, who fell heir to the Domville-Dunbar records of the Ulster County flora, was kind enough to check through several thousand cards to extract information pertaining to collections and observations made in the Catskill region of that county.

More than thanks are due to Elizabeth G. Hall, formerly librarian at The New York Botanical Garden, whose vast knowledge of botanical source material seems inexhaustible and whose boundless enthusiasm is infectious. She has been unfailing in digging out elusive books and suggesting sources of information in addition to supplying many details concerning earlier workers in the field. Special thanks are due to Richard S. Mitchell, State Botanist, for his editorial services and his painstaking work in guiding this series of bulletins through the press, to say nothing of his continued interest and encouragement. Charles J. Sheviak, Curator of Botany at the New York State Museum, has earned the writer's gratitude by making the services of his office readily available. The writer is likewise indebted to J. Kenneth Dean, a staff member at the New York State Museum, for redrawing a number of illustrations for this bulletin. Librarians at both the Horticultural Society of New York and at The New York Botanical Garden have also been most helpful. Last, but in no way least, thanks are due to Patricia Holmgren, herbarium supervisor and administrator of the phanerogamic herbarium at The New York Botanical Garden, and to George Kalmbacher, curator at the Brooklyn Botanic Garden, for permission to check specimens in the herbaria at those institutions.

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Karl L. Brooks

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15 February 1980

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ANGIOSPERMAE

The angiosperms, more commonly known as the flowering plants, constitute a large group of plants that provides the dominant vegetation of the earth. The presence of a flower as a character to distinguish angiosperms from gymnosperms, however, is largely a matter of artificial definition. In point of fact, the definition of "flower" rests on the presence of ovary tissue as distinguished from cones or clusters of fertile sporophylls that characterize the gymnosperms. Nevertheless, except for the Gnetales, there is rarely any question as to which subdivision a particular plant belongs.

In general, angiosperm flowers are made up of five whorls or series of elements arranged centrifugally on an axis in the center of which is one or more pistils, surrounded by two whorls of stamens, a corolla representing an inner series of petaloid bracts, and a calyx representing the outermost series of sepaloid bracts. There are, however, many exceptions to this stylized picture. Some flowers are represented by a solitary stamen while others may contain only a single pistil; still others can be found to represent various gradations between this single element and a "complete" flower.

While there are a number of conflicting theories as to their origin, the angiosperms are considered by most authorities to have developed from some unknown gymnosperm stock closely related to the present-day group called the "woody Ranales." In the words of Darrah (1960), "The paleobotanical record has not thus far contributed much toward an understanding of evolution within the angiosperms. We can accept, however, that monocotyledons, although they differentiated early, evolved from the dicotyledons, and that the herbaceous habit was derived from the woody habit. The herbaceous habit was attained independently in many families as a mass response to climatic-ecological stimulation." The flowering plants as a group are therefore of "modern" development, considered to be young as compared with such plant groups as the Lycopodiales, the Equisetales, and the Isöetales. The angiosperms are thought to have been in existence as early as the Mesozoic, but they are young in that it is only during and since the Lower Cretaceous that their rapidly expanding development accelerated appreciably and they became the dominant type of vegetation over the face of the globe. They are now estimated to comprise some 300 families and around 200,000 species. Since large areas of the earth are still not well explored botanically, however, the number of known species will doubtless continue to rise.

DICOTYLEDONAE

The flowering plants have long been divided by botanists into two classes, popularly known as monocots and dicots, on the basis of characteristics found in the seed. Monocotyledons have one seed leaf in the embryo while dicotyledons have two. While exceptions exist, monocotyledons are further characterized by having leaves pseudoparallel-veined with the margins almost always entire and flowers with parts in threes or multiples of three. Dicotyledons, on the other hand, in addition to embryos typically with two cotyledons, usually have leaves with netted veins and flowers with parts numerous or in multiples of four or five.

The dicots have further been divided into three large groups on the basis of floral characteristics--the Apetalae, the Polypetalae, and the Sympetalae. Simply translated, these terms mean "plants having flowers with no petals," "plants with flowers having many petals," and "plants with flowers having the petals fused together" (at least at the base). The classification of the dicots (as well as that of the monocots) has received varied treatments during the last century, even during the last few decades, and there is still much disagreement about the interrelationships of the various taxa and even about their composition, but on a worldwide basis most botanists would arrange the some 280 families of dicots into about 76 orders.

APETALAE OF THE CATSKILLS

This section is concerned with the Apetalae of the Catskills, that is, with those plants of our region that characteristically bear flowers without petals. Nearly a century ago when botanists were seriously considering the relationships of the various taxa of plants and their evolutionary development, it was thought that simple structures were indications of primitive development. Plants producing flowers with two floral envelopes (a calyx and a corolla, for example) were considered much advanced over those which had developed a calyx only. Later it became evident that the seemingly simple flowers of some plants must have evolved from more complicated structures. In other words, the simple flower structures of some plant families, at least, represent the climax of a long evolutionary development wherein they have become simpler by reduction, having somewhere along the way lost their more complex form.

As a result, when the current "manual order" (Engler system) used here was formulated, with families and genera arranged from the simpler to the more complex and presumably from the more primitive to the more highly evolved, a number of superficially similar families, not necessarily either primitive or very closely related, were placed together. This was done because as a group they appeared to possess such seemingly primitive characteristics as very small, apetalous, unisexual flowers arranged in spicate, usually pendulous catkins lacking bright color, nectar, and special odor. These flowers, in addition, usually exhibited prominent anthers that produced an abundance of pollen and large feathery stigmas. Originally, excluding the Santalales and the Aristolochiales, the Apetalae comprised a large assemblage of families (termed the "Amentiferae") that included various conifers and the Polygonales in addition to a number of other taxa.

As botanical research progressed, it became evident that certain groups of plants did not belong in the Amentiferae so they were placed with other plant groups to which they were thought to have closer affinities, but there was left a "core" of amentiferous families, which, in so far as the Catskill Apetalae are concerned, included the Salicales through the Urticales (the Polygonales having already been removed from the Amentiferae and placed in an order of its own). Doubts were still expressed concerning the relationships of the taxa making up this core, however, and, as reported by Thorne (1973), a group of botanists at a recent symposium reached the general conclusion that the Amentiferae constitute "an artificial aggregation of taxa of diverse origin that have converged to a common evolutionary plateau in possessing a large ... [number] of characteristics that adapt them for successful cross-pollination by wind." Benson (1979) seems to be in complete agreement, for he states positively that "The Amentiferae were an almost wholly artificial group." With current botanical research progressing along many avenues, plant relationships and evolutionary lines are becoming less obscure. Indications of current thought on the relationships of these taxa are presented below in discussions of the various orders and families.

In the Catskills the Apetalae are represented by such catkin-bearing trees and shrubs as the poplars, willows, hickories, birches, and oaks, by the elms, and by such herbs as the nettles, docks, and smartweeds. Included are 8 orders, 13 families, and 27 genera.

SALICÀLES

This is a small distinctive order comprising a single family, the Salicaceae, of obscure origin and definitely not closely related to other catkin-bearing families. The numerous flowers in the catkins of the plants making up this order are among the simplest of all flowers in the plant kingdom. Devoid even of a calyx, each flower consists simply of a disk bearing either a cluster of stamens or a solitary pistil, below which is a scale. This scale is deeply cut or fringed in the poplars, mostly entire but sometimes shallowly toothed in the willows. The apparent simplicity of these flowers prompted early botanists to place this order ahead of others, such as the Urticales, the flowers of which bear a true calyx. The pistil-bearing flowers of both poplars and willows develop into small bottle-shaped capsules that mature within a few weeks and split open to release the small seeds bearing "parachutes" of silky white hairs. The minute embryo in the seeds is very short-lived; if it does not find a suitable place to germinate within a day or so, it will die. It is a characteristic of many of the plants making up this order that their twigs, breaking off and lodging in moist soil, often send out roots which become embedded in the soil and develop into a new plant. Also, both poplars and willows not only hybridize readily, but the resulting seeds are reasonably fertile--an indication of a comparatively large degree of compatibility in the group. Genetic barriers are therefore not particularly rigid and species are not well differentiated; in other words, it might be said that new species are still evolving in the field to a much larger extent in this family than in most others.

SALICÀCEAE, the Willow Family

Only two genera, Populus and Salix (poplars and willows) are placed in this family. They are all woody trees or shrubs with unisexual flowers, the male and female flowers being borne on different plants. The family is of almost world-wide distribution, absent only in Austral-asia and the Malayan Archipeligo; one species, however, occurs in the Philippine Islands.

Members of this family can be distinguished from catkin-bearing representatives of other families by the comose seeds and by the flowers being apparently subtended by bracts and a cuplike disk or gland. According to Lawrence (1951), there is evidence indicating that the Salicaceae is "a more highly specialized group than most or all other amentiferous families and the only one of an order that stands well apart from other orders of dicots," although Thorne (1973), among others, feels that the Salicaceae constitutes an independent family rather closely related to the Cistales (Violales). In any case, there is rather general agreement that Populus is more primitive than Salix.

The family is important economically for the many ornamental species in both genera; as sources of wood for charcoal, pulpwood, boxes, crates, excelsior, and fuel; and as a source of withy twigs used in basketry.

Key to Genera of the Salicaceae

1. Leaf buds covered by several imbricated scales; catkins soon arching or pendulous; scales (bracts) subtending the flowers toothed to fimbriate; leaves usually ovoid to deltoid.................... Populus
1. Leaf buds covered by 1 scale; catkins ascendent or divergent, rarely drooping; scales (bracts) subtending the flowers entire or toothed; leaves usually linear to ovate............................. Salix

Populus L. Poplar, Aspen.

Populus is the oldest genus of dicotyledons yet identified by paleobotanists, for traces of it, together with those of sequoias, pines, and cycads, have been found in the lower cretaceous rocks of Greenland. This genus, conservatively estimated to comprise about 18 species in 1900, had more than 100 additional species proposed in the succeeding 50 years. botanists now consider the genus to contain about 30 species, almost entirely confined to the north temperate zone, of which some 13 species are native to North America. They are tall, fast-growing, short-lived trees with bitter and astringent bark, light weak wood, and thick, brittle, pithy twigs bearing restless foliage. In addition to the native species, one old-world poplar is familiar in the Catskills as an ornamental--the Lombardy Poplar (P. nigra var. italica), distinguished by its narrow, spirelike crown. Populus is the ancient Latin name of the poplar.

Male and female catkins are borne on separate trees (dioecious), the catkins appearing in early spring before the leaves unfold. The catkins of the poplars differ from those of the willows in the absence of nectar glands, an indication that the flowers are wind-pollinated rather than insect-pollinated. When mature, the small capsules split open to release an abundance of seeds equipped with "parachutes" of silky white hairs. Masses of white cottony material often pile up in windrows several inches thick, hence the common name "cottonwood" for some species.

Many people regard poplars as rather useless, weedy trees, but when a fire sweeps through the forest, the poplar is likely to be the first tree to help provide cover, often forming extensive forests on barren, burned, or cleared areas. They serve as nurse trees for the more valuable hardwoods and conifers whose seedlings must have shade until they become fully established and, as such, poplars have a definite place in the succession of trees leading to the climax forest.

Several species, long in cultivation, were valued originally for their rapid growth, for poplars are among the quickest-growing of all hardy trees;

some species have been known to attain a height of 50 feet in 15 years. They grow readily amidst the dust and smoke of crowded towns and may be successfully planted in situations where no other tree will flourish. Some species are therefore planted as ornamental trees and for screens and windbreaks, the rapidity of their growth and the ease with which they can be propagated by cuttings making them valuable for such purposes. They are well adapted for shelter belts, particularly in the dry plains of the Middle West, where they are also valuable shade trees. Male trees are preferred for this purpose, because the female trees produce the cottony material that litters gardens, lawns, and streets. When poplars are used as yard or street trees, however, it must be remembered that all species have invasive roots that travel far toward moisture, so they may clog drains and sewers. A further disadvantage is that their branches are brittle and liable to wind damage. In addition, the sucker shoots can become a nuisance, for cutting them off simply encourages them to fresh activity.

In Europe the wood was used by the ancients to make bucklers or shields, as it is very light and quite tough. Not easily broken, pierced, or splintered by a blow, it could only be dented. In the 1800's it was considered of value for flooring because of its whiteness, ease in scouring, difficulty in catching fire, and slowness in burning. Although it rots quickly when exposed to the weather, Emerson (1878) quoted an old saying, said to have been inscribed on a poplar plank, concerning its durability:

> Though heart of oak be e'er so stout,
> Keep me dry and I'll see him out.

Poplar wood is soft and not strong, but that of many species is of considerable commercial value, now used chiefly for the manufacture of wood pulp, though some lumber is used in construction work as well as in the manufacture of crates, baskets, boxes, matches, woodenware, excelsior, and veneer. Peattie (1950) states that in 1940 some 153,500,000 board feet of cottonwood or popple (as the woodsman prefers to call it) lumber was cut, chiefly in the Mississippi valley. For fuel, poplar wood is similar to that of willow. Poplar bark, twigs, buds, catkins, and foliage are valuable winter and spring food for various species of birds and mammals, including ruffed grouse, whitetail deer, beaver, porcupine, cottontail rabbit, and black bear.

Poplars have an additional advantage in that they hybridize easily and can now be practically bred to order, a quality which plant breeders have only comparatively recently come to appreciate. Hybrid poplars grow faster than our native species and are better able to resist the inroads of insects and diseases. Breeding is simplified both because the hybrids are reasonably fertile, and branches cut from mature trees can be made to flower and fruit in the greenhouse. They can also be reproduced easily from stem cuttings. In the United States hybridizing poplars to produce fast-growing trees for reforesting cut-over pulpwood lands was first advocated in 1916, but two world wars delayed progress until 1947. Research in this area is now also well under way in several other countries.

The inner bark of some European poplars has occasionally been used in northern Europe and Asia as a substitute for flour in making bread during times of scarcity. The wood is used in the manufacture of matches and paper, and the bark has been employed in tanning leather. The leaves and young shoots of poplar are said to be gathered in Sweden to feed sheep, cattle, and goats in winter--a practice as old as the time of the Romans. An unusual use was reported by W. H. Dall, writing of Alaska in 1897; "cotton" from fruits of the poplar was cut fine and mixed with tobacco by the economical Indians of that region.

Several trees of this genus have proved of value in medicine. In some species the leaf buds are covered with a resinous exudation, which has an agreeable balsamic odor and a bitterish, somewhat pungent taste, a medicinal substance much used both in Europe and in the United States. The inner bark of both European and native species is possessed of tonic and antiperiodic properties that have been successfully employed in the treatment of intermittent and other fevers. A number of Indian tribes likewise made use of several of the native species for medicinal purposes. Vogel (1970) states that the Choctaws of Louisiana boiled the leaves and bark of "Carolina Poplar" (probably P. deltoides) in water to create a steam used in the treatment of snake bite, while the Chickasaws treated dysentery and fevers by boiling the roots of Cottonwood and willow together to make a drink. The Creeks used a species of poplar in treating fractures and sprains, boiling the bark and pouring the resulting liquid over the injured part. The Ojibwas applied the cotton down from the fruits of one of the poplars as an absorbent in open sores. Other tribes made a tea of the fresh flowers for use as a spring tonic "to purify the blood," and the boiled leaves were employed in a drink for curing the retention of excess water in the body.

Dyes can be extracted from the bark and shoots of a number of poplars, but the favorite species appears to have been the Lombardy Poplar, the leaves of which give distinctive colors with different mordants. To prepare the dye, 1 1/2 pecks of fresh leaves were chopped and soaked in water overnight. The next day this mixture was heated gradually and boiled 45 minutes to an hour; when cool enough to handle, the liquid was strained into a container. To dye lime yellow, 1 pound of alum-mordanted, wetted wool was put into 4 1/2 to 5 gallons of lukewarm dye bath, which was then heated to the boiling point and simmered until the color was right, then rinsed, and dried in the shade. To dye a golden brown, chrome-mordanted wool was used. A cinnamon-aurora was also secured from the fresh young shoots of this species by using a tin mordant.

Key to Flowers and Winter Buds

1. Scales of catkins merely dentate or with 3-7 linear-triangular, long ciliate teeth bearded at summit; stigmas 2, each deeply 2-parted, appearing like 4 linear stigmas; overwintering terminal buds not viscid, 3-10 mm long, 2
    2. Scales of the staminate flowers merely dentate; twigs and terminal bud tomentose.. P. alba
    2. Scales of the staminate catkins deeply 3-7-lobed, 3
        3. Terminal bud dull brown, pubescent; stigmas without recurved basal lobes; expanding leaves thick and white-felted.. P. grandidentata
        3. Terminal bud shining, glabrous, or the lowest scales minutely ciliate; stigmas with strongly dilated and recurved basal lobes; expanding leaves thin and glabrous or promptly glabrate......................... P. tremuloides

1. Scales of catkins deeply and copiously fimbriate, beardless; stigmas 2-4, broadly dilated; overwintering terminal buds glabrous, viscid, 1-2.5 cm long, 4
    4. Bracts with 9-11 slender segments; stigmas appressed-reflexed against the ovary, with entire ovate lobes (twigs glabrous) .... P. nigra
    4. Bracts fringed with very many slender segments; stigmas with broad lobulate or crenate spreading lobes, 5
        5. Overwintering buds not strongly balsamic; outer scales puberulent at base; vigorous sprouts often 4-angled or winged; stigmas 3 or 4; anthers about 60 .... P. deltoides
        5. Overwintering buds strongly balsamic; outer scales glabrous; sprouts and branchlets terete; stigmas 2; anthers fewer than 30, 6
            6. Branchlets glabrous; young leaves glabrous or nearly so, cuneate or rounded or barely subcordate at base .... P. balsamifera
            6. Branchlets pubescent; young leaves pubescent, with cordate base .... P. x gileadensis

Key to Well-grown Foliage, with or Without Fruit

1. Petioles terete or nearly so, usually shallowly channeled above; buds strongly resinous and scented (except for P. alba), 2
    2. Mature leaves heavily white-felted beneath, 3-5-lobed (especially those of sprouts or strong shoots), not serrate; balsamic fragrance absent .... P. alba
    2. Leaves metallic-lustrous beneath, unlobed, with strong balsamic fragrance, lanceolate to cordate-ovate, acuminate, closely fine-toothed, 3
        3. Leaves cuneate to rounded or subcordate at base, narrowly ovate to lanceolate, glabrous or but sparsely pubescent on midrib beneath; twigs glabrous .... P. balsamifera
        3. Leaves broadly cordate-ovate, pubescent beneath, strongly so on nerves and midrib; twigs pubescent........... P. x gileadensis
1. Petioles distinctly flattened or compressed, especially toward summit; buds only slightly resinous, if at all, 4
    4. Leaves dull or gray-green, ovate to suborbicular or elliptic, lacking a translucent border; teeth mostly rounded at summit, 5
        5. Each margin finely crenulate-serrate with 20-40 or more teeth, glabrous when young; terminal bud shining, glabrous .... P. tremuloides
        5. Each margin with 5-15 coarse and remote unequal deltoid teeth, tomentose when young; terminal bud dull brown, thinly tomentulose .... P. grandidentata
    4. Leaves bright or yellow-green, deltoid or rhombic, copiously dentate, with a definite translucent border, teeth terminating in an incurved callous point, 6
        6. Mature blades of short branches (not sprouts) 6-12 cm broad, usually longer than wide, with basal glands; vigorous shoots and sprouts angled; tiny hairs present on edges of leaf blade .... P. deltoides

6. Mature blades 3-8 cm broad, usually wider than long, without basal glands: vigorous sprouts and shoots terete; no hairs on edges of leaf blade.. P. nigra

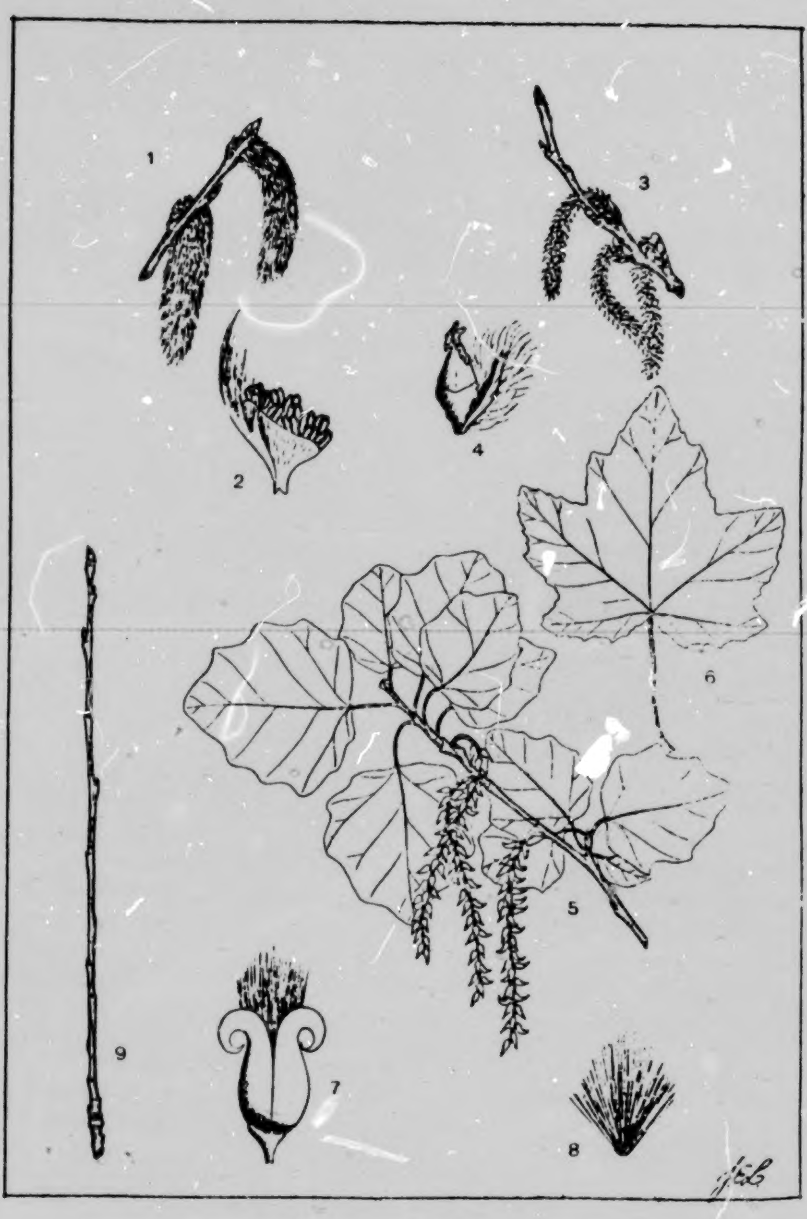
Populus alba L. White Poplar.

Meaning of Species Name. White.
Other Names. Abele, Silver-leaf (or -leaved) Poplar, Aspen, Abel-tree, Rattler-tree, White Aspen, Great Aspen, Dutch Beech, White-bark, European Aspen, Maple-leaved Poplar.
Type of Plant. A medium to large-sized tree, growing from 40 to 75 ft high, with a trunk 2 to 4 ft in diameter.
Habitat. In yards, along roadsides, and borders of fields, springing up from suckers of older trees, often obnoxious.
Range. NB to Ont, s to Va.
Distr in NYS. Common in cult and natzd in many areas.
Distr in the Torrey Range. Locally abundant as an esc.
Time of Fl. Apr; Apr 25-May 10 at Cornell.
Origin. Eurasia; introd and natzd from Eu.
Remarks. Wood soft, nearly white; wt 38 lb per cu ft.

This European poplar has long been in cultivation, for it is a decorative tree both by reason of the bark of the young shoots and the beauty of its dark, glossy leaves with silvery, felted undersides. This sprightly contrast of light and shade in the restless leaves is unusual and attractive in early spring. It grows rapidly, is adapted to a wide variety of conditions, and is quite tolerant of city smoke, but the felted leaf-linings collect soot and dust, which they carry to the end of the season. As a dooryard tree this species has a wider popularity than it deserves, for the wind breaks off the brittle branches and the tree often sends up numerous suckers for some yards around the trunk, defying practically all efforts to eradicate them. The wood is very white with a soft and even grain. It is used by turners and toymakers and for the construction of packing cases. Europeans long made use of the inner bark of this species as a tonic and febrifuge; it was listed as an official drug in the U.S. Pharmacopeia, 1895-1936.

Populus balsamifera L. Balsam Poplar.

Meaning of Species Name. Balsamic, from the resinous buds.
Other Names. Balm-of-Gilead, Hairy Balm-of-Gilead, Hackmatack, Hackmatack Poplar, Tackamahac, Tacamahac, Tacamahac Poplar, Balsam, Balm Buds, Black Poplar, Poplar Balsam, Carolina Poplar, Cottonwood, Rough-barked Poplar.
Type of Plant. A large tree ordinarily reaching a height of 60 to 80 ft and a trunk diameter of 1-2 ft.
Habitat. Along streams, lakes and borders of swamps, and on ridges and summits.
Range. Lab to Ak, s to n Pa, Ind, Ia, nw Neb, Col, Nev, and Ore.
Dist in NYS. Common through the Adirondack reg and across the n part of the state; less common southw to Dutchess co, the higher Catskills, and westw to Wyoming and Niagara co.
Distr in the Torrey Range. Not listed in Taylor (1915).



Populus alba--White Poplar
[From Brown (1921), p. 126.]

Elevation. Collected at 1300 ft in Delaware co.
Time of Fl. Apr 25-May 10 at Cornell.
Origin. Native.
Remarks. Wood soft, weak, brown, compact; wt 23 lb per cu ft.

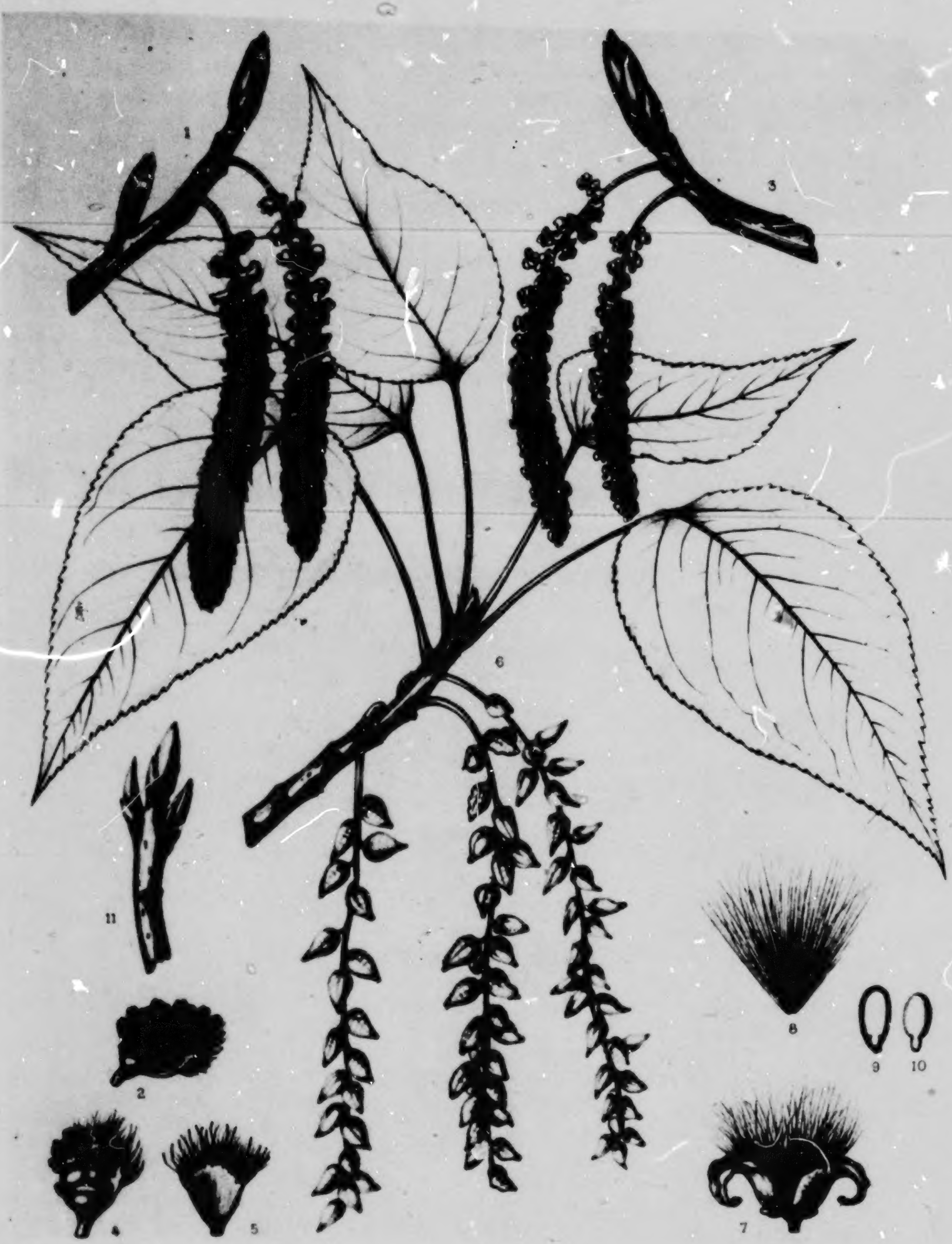
This is the largest of the subarctic trees of America, extending south only as far as northern Pennsylvania, Colorado, and Oregon. Small isolated colonies are found locally somewhat farther south, doubtless the remnant of much more extensive stands that flourished in earlier postglacial times. It reaches its best development in the valley of the Mackenzie river in northwestern Canada, where, in the endless monotony of horizontal scenery, it is the most conspicuous feature of vegetation over areas thousands of square miles in extent, providing an element of surprising beauty and giving fuel and shade where none could be expected. Its great size and the brilliancy of its leaves, displaying in turn, as the wind plays among its branches, their dark green upper and their rusty lower surfaces, often make it a splendid object. Woodsmen often call this tree the Balm-of-Gilead, a name botanists reserve for another tree commonly planted for shade in Canada and the northern United States.

The Balsam Poplar is the Tacmahac of the northern Indians. They extracted the fragrant wax from the winter buds and used it to seal up the seams of their birch-bark canoes. Bees may have taught the Indian the use of this secretion, by which the tree seals the bud scales to keep out water. When growth starts in the spring, this wax softens; the bees then collect and store it, later to employ it in sealing up the crevices of their hives. As a consequence, this tree is often planted near apiaries, as also is the Balm-of-Gilead Poplar; on the Prairies it is frequently planted for shelter belts.

In cultivation this species has proved itself a tree of excellent habit and rapid growth, easily propagated and transplanted, particularly in situations where it is difficult for other trees to grow. The abundant cotton of the female catkins constitutes an objection, but a more serious one is the liability of the branches, sometimes even the trunk, to suffer wind damage. In addition, it is not easily eradicated on account of the extreme vitality of the roots, which for years continue to send up sucker shoots. Its roots often extend a very great distance underground; Emerson (1878) reported one instance in which the roots grew beneath a house 40 feet wide and sent up suckers on the other side.

When it is cut for lumber, its light soft wood usually loses its identity in the general designation of "popple," so it cannot always be distinguished statistically from other species. Its wood is nearly ideal for paper pulp, especially in the manufacture of magazine stock. Though weak and soft, the wood of Balsam Poplar is remarkably tough in proportion to its light weight. This makes it valuable for boxes, berry baskets, crates, and small packing cases. It is also used by furniture manufacturers as a foundation for costlier veneers. On the northern shores of the Great Lakes the thick bark from the bases of old trunks has been used as a substitute for cork to float fishermen's nets.

The Indians were well acquainted with the medicinal properties of this species, boiling the resinous buds in fat to make a salve for dressing wounds and to apply to persistent sores and eczema. They also rubbed the ointment up the nostrils to relieve congestion of the respiratory passages in the treatment of colds, catarrhs, and bronchitis, the turpentine-like odor stimulating the tissues of the respiratory passages. Densmore (1928) supplies more specific details concerning the medicinal uses of this plant among the Chippewas, who employed it as a treatment for heart trouble, sprains or strained muscles, pains in the back, female weakness, and excessive blood flow. For the latter one root of this species was combined with one root of Trembling Aspen (P. tremuloides) and steeped, not boiled, in 1 quart of water, of which a potion was given about every hour. This remedy was "used for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Populus balsamifera--Balsam Poplar
[From Sargent (1891-1902), Vol. IX, Plate 490, p. 167.]

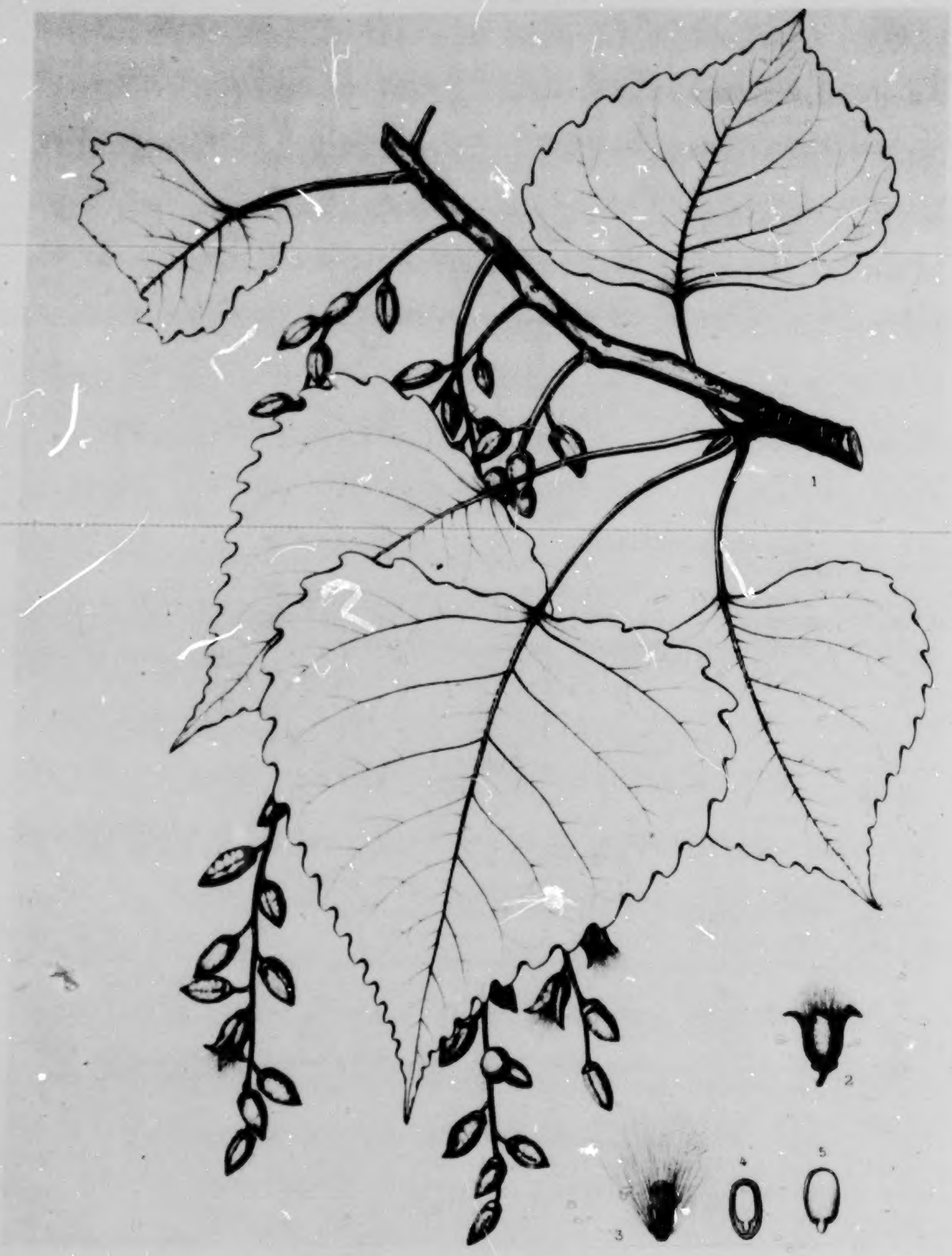
excessive flowing during confinement or to prevent premature birth." For pain in the back and female weakness a decoction was made of equal portions of the roots of this tree and an unspecified species of thistle (*Cirsium*). A handful of the roots was boiled thoroughly in 1 quart of water, of which about a quart a day was taken "often and freely." For sprains and strained muscles the buds were collected before they opened. These were either steeped for use as a poultice or boiled in grease for an ointment, using "about a handful of buds to a cup of grease." Deer tallow was not considered good for this purpose, "but bear's grease is excellent."

The fragrant resin from its buds was also used by the early settlers as an ointment and as an ingredient in cough medicine. In the form of a tincture they were used in pectoral, nephritic, and rheumatic complaints; and a liniment, made by macerating the buds in oil, was applied externally in the treatment of rheumatism. A tincture of the inner bark was used in treating pulmonary disorders, stomach and kidney ailments, gout, rheumatism, and scurvy, an ailment caused by vitamin C deficiency. The buds are also rich in salicin, so their effects are similar to aspirin in many respects. They were official in the *National Formulary*, 1916-65, for their stimulant and expectorant properties and are still in current demand by drug companies processing botanical products.

Populus deltoides Marsh. Eastern Cottonwood.

Meaning of Species Name. Deltoid, from the shape of the leaf.
Other Names. Necklace Poplar, Carolina Poplar, Water Poplar, River Poplar, Berry-bearing Poplar, Big Cottonwood, Yellow Cottonwood, Cotton-tree, Eastern Poplar, Whitewood, Common Cottonwood.
Type of Plant. A large tree, the largest of the eastern poplars, usually attaining a height of 50-100 ft and a trunk diameter of 2-4 ft.
Range. Que and Ont to Man, s to Fla and Tex.
Distr in NYS. Frequent or locally abundant across the state from L Champlain w to Jefferson co (outside the Adirondacks), L Ontario, and L Erie; increasingly common sw and westw, especially along the larger rivers.
Distr in the Torrey Range. NY: Bronx co, highlands of the Hudson, increasing northw; rare or wanting s of the moraine on LI.
Elevation. Sea level-815 ft in the Torrey range according to Taylor (1915), but it has since been collected in the Catskills at 1400 ft.
Origin. Native.
Time of Fl. Apr-May; Apr 25-May 10 at Cornell.
Remarks. Wood light, soft, weak, brittle; wt 24 lb per cu ft, dry wt. Of the 4 poplars with flattened leafstalks, only this one has 2-3 small but obvious glands at the top of the petiole.

The loosely flowered fruiting catkins of this species form a pendant string of ripening pods 6-10 inches long, whence one of its common names, Necklace Poplar. Absent from most of the Appalachian region and not too common in the northeast, this species grows in greatest abundance west of the mountains. As practically the only large tree in many parts of the midwest, the Eastern Cottonwood played an important part in the settlement of the prairie states west of the Missouri river in an immense number of ways. Poor though its wood might be, in the days before railroads joined the forests of



Populus deltoides--Eastern Cottonwood
[From Sargent (1891-1902), Vol. IX, Plate 495, p. 179.]

the east with the western plains, it furnished material for their first buildings, from the rough stockades raised to protect the struggling settlers against the Indians, to the cabins, stables, churches, schoolhouses, and hotels of the infant settlements, to say nothing of offering shade from the hot summer sun and providing fuel to ward off winter's bitter cold. Being practically the only wood available, it was also used to build fences, corncribs, ox yokes, and saddletrees. Even the leaves were useful as food for livestock. Like many other poplars, this tree is easily propagated in spring by planting a piece of branch in moist earth; it may attain a height of 4-5 feet the first season, so it was much planted as a windbreak or shelterbelt. The plains Indians used the root wood for starting fire by friction, but as firewood, when dry, it burns quickly without leaving a bed of coals.

The wood of the Eastern Cottonwood is not durable and it checks and warps badly in seasoning, but for decades it was used for boxes, berry baskets, crates, barrel staves, ironing boards, trunks, pails, tubs, furniture, excelsior, and wood pulp. Steyermark (1963) remarks that "The thick bark was reported to be used by children of early pioneer families for whittling out toys." In this century its production has steadily fallen off, however, for the largest trees have been felled and it is no longer a very important timber tree. But it grows rapidly and is sometimes still planted as a shade tree (in 15 years it may be 60 feet high), but it is rather short-lived, subject to wind damage, and its roots often cause trouble in sewers and drains. In addition, its root system is so shallow that it often blows over in high winds. In 70 years the Eastern Cottonwood is already old, after which it begins to deteriorate rapidly, but the hollow tree provides nesting sites for flickers, sapsuckers, bluebirds, owls, and other birds that nest in holes. It is also a year-round larder for the sharp-tailed grouse, which has been reported to eat the buds, catkins, and leaves.

Through the seasons the Eastern Cottonwood presents a drama of changing appearance. In late winter the bark of boughs and twigs begins to brighten, announcing the rising of the sap. Its buds are large and gummy, but they lack the strong firlike fragrance of the Balsam Poplar. The catkins appear in early spring, the male bright yellow, the female a rich carmine. As the flowers are falling, the leaves begin to appear, coppery at first and strikingly handsome. In midspring the seed pods burst, releasing the cottony seeds, reminding one of thistle down and milkweed pods in fall. Then all summer long the green leaves rustle with every slightest breeze, described by Peattie (1950) as "heavier and coarser than the music of Aspen foliage, a sound like a sudden gush of water that as quickly stops, like the rustle of heavy skirts, like distant pattering applause." In fall the leaves turn yellow, dropping one by one to leave the tree naked and bare, its stout branches clearly silhouetted against the sky. With its massive pale stem, its great spreading limbs, and broad head of pendulous branches covered with fluttering leaves of the most brilliant green, this species is one of the stateliest and most beautiful trees of eastern America.

Populus x *gileadensis* Rouleau. Balm-of-Gilead.

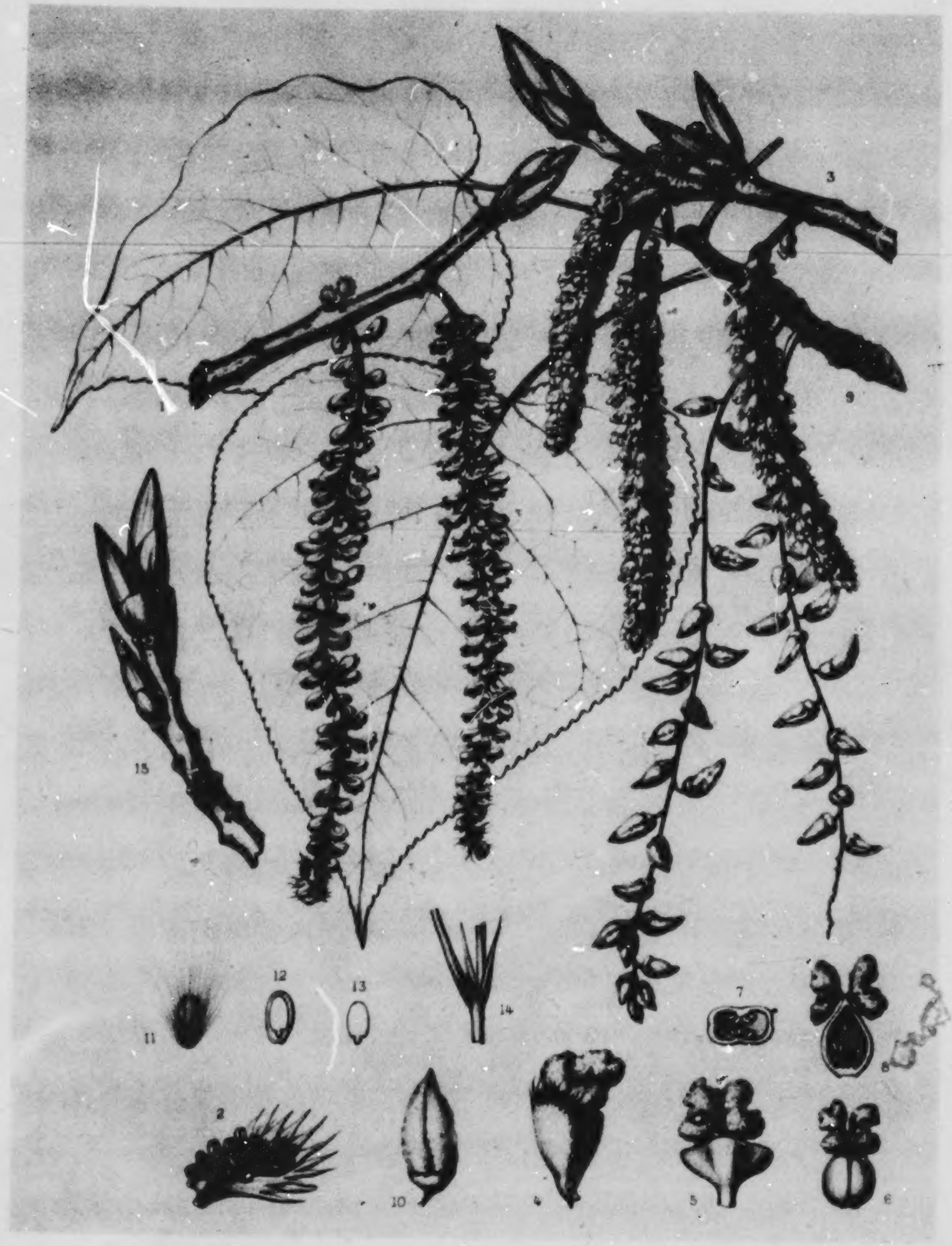
Meaning of Species Name. Of Gilead, from the common name.
Synonyms. *P. candicans* Ait. in Gleason (1952).
Type of Plant. A large tree.
Habitat. Roadsides, along streams, and in old fields.
Range. Nf to Ont, s to Va.
Distr in NYS. No specific data on distr given in House (1924).
Distr in the Torrey Range. A rather uncommon esc in most parts of our range.
Time of Fl. Apr 25-May 5 at Cornell.
Origin. A much cult tree of doubtful origin.
Remarks. Spread from cult. Except for *P. alba*, this is the only poplar of the Catskills with pubescent petioles.

Settlers in the Smoky Mountains used the buds of Balm-of-Gilead, probably a cross between *P. balsamifera* and *P. deltoides*, in the same manner as did the Indians, making a salve for muscular aches and soreness. Rafinesque found the bark to be emetic and cathartic. In 1852 Dr. Clapp ascribed tonic and febrifuge properties to this species, saying that it possessed properties similar to those of the willow in addition to being useful as a stimulating diuretic. The buds were official in the *National Formulary*, 1916-65, for their stimulant and expectorant properties. While drug companies list only "*Populus tacamahacca*," a synonymn of Balsam Poplar, as being in current demand, it is quite likely that the buds of Balm-of-Gilead are equally acceptable.

Populus grandidentata Michx. Large-toothed Aspen.

Meaning of Species Name. Large-toothed, from the leaves.
Other Names. Poplar, Aspen, Popple, White Poplar, Big-toothed Aspen, Large-toothed Poplar, Big-toothed Poplar.
Type of Plant. Usually a small to medium-sized, short-lived tree 30-50 ft high with a trunk diameter of 1-2 ft.
Habitat. Dry woods, slopes, cut-over lands, and forest openings.
Range. NS, Que, Ont, and Minn, s to NC, Tenn, Ia, and Mo.
Distr in NYS. Common or frequent throughout most secs of the state.
Distr in the Torrey Range. NY: Frequent on LI and SI, increasing and common northw.
Elevation. Has been collected at 2000 ft in Delaware co.
Time of Fl. Apr; Apr 10-30 at cornell.
Origin. Native.
Remarks. Very abundant northw, where it usually grows in drier soil than *P. tremuloides*. Wood soft, weak, compact; 29 lb per cu ft, dry weight. The large teeth of the leaves and the distinctly hairy buds distinguish this species from *P. tremuloides*, which has fine-toothed leaves and glabrous buds.

The large-toothed Aspen is less common than Trembling Aspen and in the northeast often reaches greater size. Like other native aspens, it frequently pioneers in burned-over areas and abandoned fields, serving as a valuable nurse tree for subsequent forest growth, but Grimm (1966) remarks that "it shows a more marked preference for richer and moister soils" than such species as Trembling Aspen. When growing by itself or on the edge of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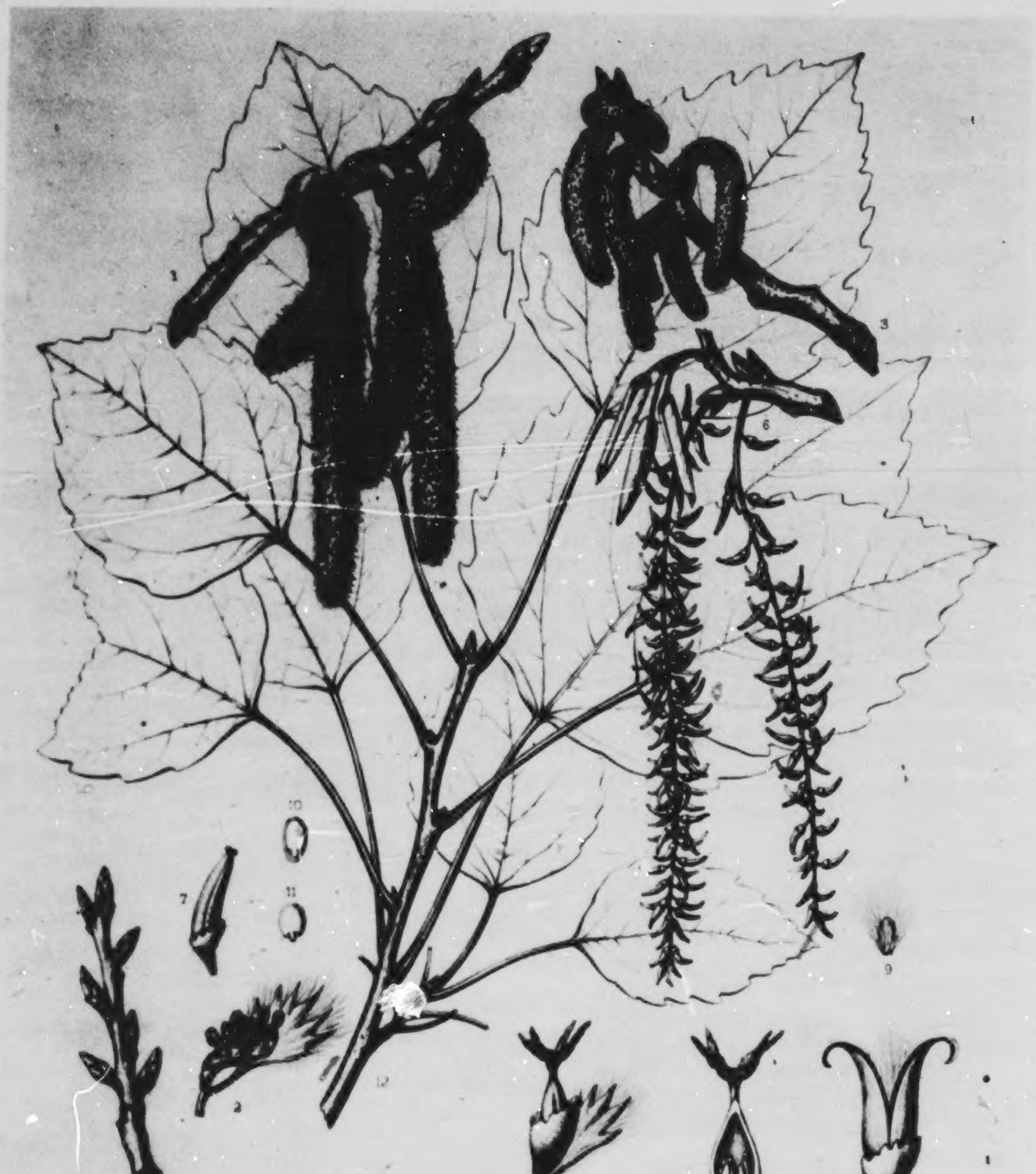
Populus x gileadensis--Balm-of-Gilead
[From Sargent (1891-1902), Vol. IX, Plate 491, p. 167.]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Populus grandidentata--Large-toothed Aspen
[From Sargent (1891-1902), Vol. IX, Plate 488, p. 161.]

a wood or lake, it commonly has an open and rather graceful crown, forming a beautiful object from the soft green of the trunk, the lightness of the branches, and the mobility of its foliage. Like other aspens, it also propagates freely from root suckers. Unique among the poplars, the close-grained, light wood is occasionally beautiful. The velvety white sapwood has a natural sheen and the light tan heartwood is sometimes streaked with brown, reminiscent of olive wood. Also, "feather crotches" of exquisite beauty sometimes develop, eagerly sought after for use as veneer in the manufacture of radio cabinets and bedroom suites. Ordinarily, however, the wood is not distinguished commercially from that of the other aspens, accompanying them to the pulp mill or being manufactured into boxes, crates, excelsior, and match sticks. In the time of our great-great-grandmothers, when fashion required that ladies should seem somewhat taller than nature made them, the light wood of this poplar was in demand as best adapted for making the high heels of their shoes, the manufacture of which constituted a distinct trade. The wood was also extensively used in the manufacture of hats before the palm leaf was introduced. The peeled logs, treated with creosote, have lately been successfully used in the construction of log cabins. When dry, its wood is considered equal to pine as fuel; and, as the tree grows readily and rapidly, it might well be planted for this purpose.

The Large-toothed Aspen is one of the most important members of the native poplars so far as wildlife is concerned. Their buds and catkins are valuable winter and spring food for various kinds of grouse; the tender bark, twigs, and foliage are eaten freely by beaver, rabbits, deer, and moose; and the bark, foliage, and buds are relished by beaver and porcupines.

Populus nigra L. Black Poplar.

Meaning of Species Name. Black.

Other Names. Willow Poplar, Catfoot Poplar, Devil's-fingers, Old English Poplar.

Type of Plant. A large tree, sometimes 100 ft tall with a trunk 4 ft in diameter, but usually smaller.

Habitat. Usually in moist soil.

Range. Valleys of the Hudson and Delaware rivers.

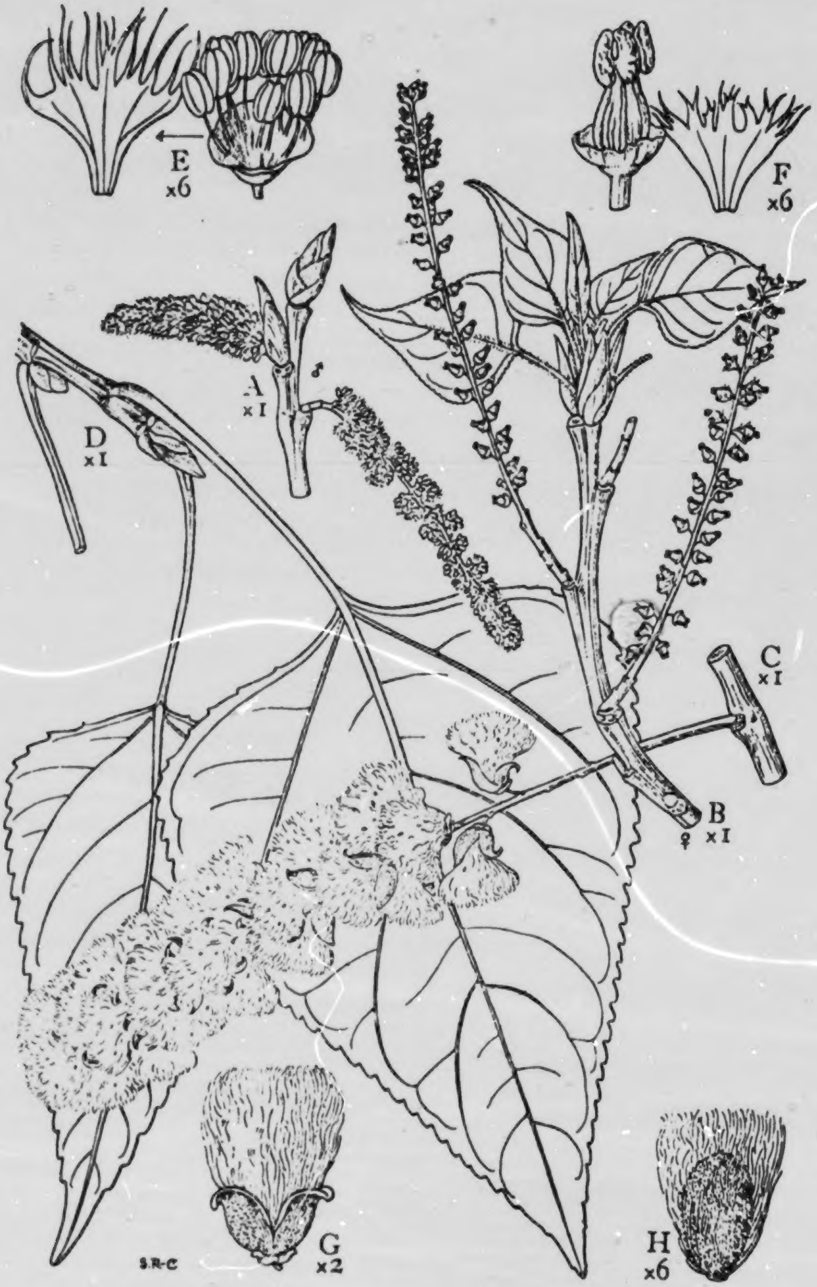
Distr in NYS. Frequent or common in many places and especially common in the valley of the Hudson river and along tributary streams, where it has been natzd from Eu since early colonial times.

Distr in the Torrey Range. Rare and local in the Delaware valley; not recently collected from the lower Hudson valley; otherwise unknown.

Time of Fl. Apr-May; Apr 15-30 at Cornell.

Origin. Native of Eurasia; natzd from Eu.

The buds of the European Black Poplar, like those of the Balsam Poplar, are covered with a fragrant, resinous substance that can be extracted in boiling water. The odor resembles that of incense; the taste is bitter and rather unpleasant, but the extract has been used as a stimulant, tonic, diuretic, and antiscorbutic. According to Grieve (1967), a tincture of the balm was once considered useful "for complaints of the chest, stomach, and kidneys, and for rheumatism and scurvy," and mixed with lard or oil, it was employed "as an external application in bruises, swellings, and some cutaneous diseases." One authority states that an extract from the buds has also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Populus nigra--Black Poplar
[From Ross-Craig (1970), Part XXVII, Plate 40.]

been used in the treatment of nervous disorders. In Asia and northern Europe, the inner bark has occasionally been used as a substitute for flour in making bread during times of scarcity. The wood of this European species, which is soft and splits readily, has been much used in central Europe in making packing cases, trays, bowls, dishes, and the soles of shoes. The bark has likewise been used in tanning leather, and that from the base of old trunks for the floats of fishnets. The vigorous young shoots sometimes replace those of the willow in coarse baskets, and the hairs which surround the seeds have been utilized as a substitute for cotton in padding garments and for stuffing cushions and mattresses. Johnson (1867) also remarks that the cottony material of the seeds has "been made into good paper," but adds that "the quantity yielded by the tree is too small to render its cultivation with this object profitable."

Populus x smithii Boivin. Smith's Hybrid Poplar.
(P. grandidentata x P. tremuloides)

This hybrid was first described by Wagner in 1970. Mohlenbrock and Evans (1974) state that it "is intermediate in several characters between the parent species, the most obvious being the number of dentations along the leaf margins." The writer has collected it once in the Town of Roxbury, but it should be looked for elsewhere in the Catskills, for both parents are often found growing in close proximity. It can be distinguished from its parents as follows:

1. Margin of leaf finely crenate, with 20 or more teeth (averaging 31); buds glabrous or nearly so............................ P. tremuloides
1. Margin of leaf dentate, with 5-25 teeth (averaging 10-20) buds pubescent, 2
    2. Margin of leaf with 5-15 teeth (averaging 10); petiole 5-10 cm long (averaging 7 cm)............................ P. grandidentata
    2. Margin of leaf with 12-25 teeth (averaging 20); petiole 3-6 cm long (averaging 5.5 cm)............................ P. x smithii

Populus tremuloides Michx. Trembling Aspen.

Meaning of Species Name. Like the European P. tremula.

Other Names. American Aspen, Quiver-leaf, Small-toothed Aspen, Popple, American Poplar, Trembling Poplar, White Poplar, Mountain Aspen, Trembling Asp, Quaking Asp, Mountain Asp, Poplar, Tremble.

Type of Plant. A slender short-lived, fast-growing tree, usually reaching a height of 40-50 ft and a trunk diameter of 8-15 in.

Habitat. Open woods, recent burns, roadsides, fencerows, and cut-over land, usually in poor rocky, sandy, or gravelly soil.

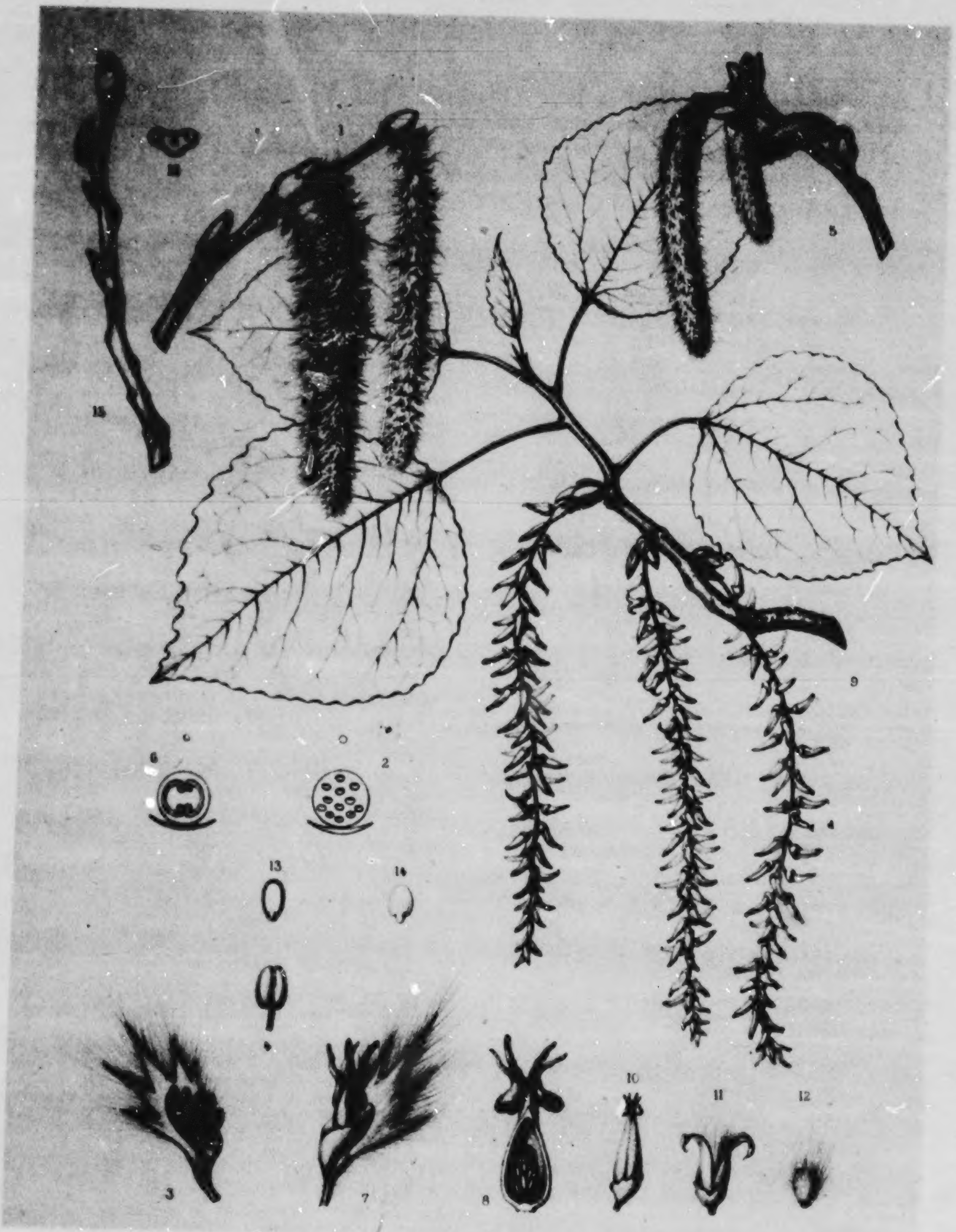
Range. Lab to Hudson Bay and Ak, s to Va, Tenn, and Mo, and in the w to NM and Lower Cal.

Distr in NYS. Common throughout most secs of the state, but infrequent on LI and rare in the pine barrens of LI.

Distr in the Torrey Range. Throughout the range, except in the pine barrens and s of them, apparently always increasing northw.

Elevation. Grows to 3000 ft in the Adirondacks.

Time of Fl. Mar-May; Mar 25-Apr 15 at Cornell.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Populus tremuloides--Trembling Aspen
[From Sargent (1891-1902), Vol. IX, Plate 487, p. 158.]

Origin. Native.
Remarks. Wood soft and weak; wt 25 lb per cu ft, dry wt.

The Trembling Aspen is the most widely distributed tree in North America, often ascending to 10.000 feet in elevation, attaining its largest size in the prairie region. The tree gets its name from the almost incessant rustling of its leaves, the long, slender petioles of which are flattened as though they had been pinched inward from the sides. It is indifferent as to soil, growing almost everywhere except in the wettest swamps.

Its wood is very light, soft, weak, close-grained, and brittle, but it has become valuable as a source of pulpwood, not for newspapers but for magazine stock. Steyermark (1963) states that "It is the species chiefly used in North America for pulpwood in papermaking." Since it can reproduce itself within 50 years, what seems like a frail, shallow-rooted tree may prove of more value than many other species regarded more highly. It also has limited value in the manufacture of boxes, berry crates, kegs, wooden dishes, excelsior, matches, and various small turned articles. The wood decays rapidly on exposure to the elements, but, treated with creosote, the peeled logs have been used to build log cabins. In the west it was at one time occasionally used for flooring, having a good color and not being liable to splinter. Sargent (1891-1902) stated that the wood is the principal fuel of the northern Canadian Indians and that it burns freely even when green. Seton, however, remarked that "when green it is so heavy and soggy that it lasts for days as a fire check or backlog."

The great value of the Trembling Aspen lies in the power of its small seeds to germinate quickly in soil which fire has rendered infertile and in the ability of the seedling plants to grow rapidly in exposed situations. Preventing the washing away of the soil from steep mountain slopes and affording shelter for the young of longer-lived trees, it has played a chief part in forming a temporary cover on abandoned fields and land that has been denuded. But its value to wildlife in many respects transcends its use to man, for its inner bark is a favorite food of the beaver, and its trunks and branches are utilized in the construction of their houses and dams. In winter, when other foods are scarce, the varying hare and the snowshoe rabbit likewise feed on the bark of this species. In addition, the twigs are often browsed by moose and white-tailed deer, and the winter buds are consumed by ruffed grouse. Having a much wider range and being much more common than P. grandidentata, it is much utilized by a larger variety of animals.

By many the Trembling Aspen is considered the prettiest of all the poplars. In March the bare, angular limbs take on a greenish glow, one of the first prophecies of spring. Then the buds cast their shining chestnut scales and the fuzzy, mouse-gray catkins are revealed. "There are few shades of olive and rose, few textures of silk and velvet that are not duplicated as the catkins lengthen and dance like chenille fringe from every twig," as Rogers (1926) puts it so aptly. "With the flowers, the new leaves open ..., passing through various tones of pink and silver on their way to their lustrous, bright green maturity." This is a most "talkative" tree, for even a slight breeze will set the foliage into a "panic of whispering." The small leaves of this species make a much softer sound than the coarser leaves of the Large-toothed Aspen, and as the leaves rustle, they also twinkle, dancing and catching the sunlight like ripples on the surface of a stream.

Then, in autumn, the foliage turns a clear gold, in the sunlight almost literally blazing with a yellow flame. A graceful tree with its slender pendulous branches, shimmering leaves, and pale bark, Trembling Aspen enlivens the spruce forests of the north and marks steep mountain slopes with broad bands of color, light green during the summer and in autumn glowing like gold against backgrounds of dark cliffs and stunted pines.

Densmore (1928) describes a singular use of the sap of this species as food among the Chippewa Indians: "If the bark of the poplar is cut and turned back from the tree in the early summer there is found between the bark and the wood a sweetish sirup which can be put in birch bark [containers] and kept for a short time. This is especially liked by children and young people." They also made medicinal use of the dried inner bark of this species in treating cuts, diseases of women, and heart ailments; in the latter case it was usually combined with the bark of two species of oak and the powdered root of *Polygala senega*. The Cree Indians of the Hudson Bay region not only ate the inner bark for food, but they also considered an infusion of it as a gentle laxative and an excellent remedy for coughs.

The bitter inner bark of this species, gathered in the fall of the year (although some authorities suggest spring), was once likewise considered by the whites as a very valuable remedy long relied upon to treat fevers, for use in tonics, to promote sweating, and to act as a diuretic in the treatment of urinary afflictions. Millspaugh (1887) reported that its therapeutic properties were considered "to be nearly ... identical with those of the willow," but he believed that "its tonic properties are considerably superior to those of salix." As a tonic, a tincture of the fresh inner bark was prepared, prescribed in cases of general debility. To make a tonic Lighthall (n.d.), an Indian "medicine man," combined "equal parts of the [dried] inner barks of poplar and dogwood [*Cornus florida*] and sarsaparilla root, cut up fine and put in a quart bottle until it was half full." He then added whiskey to fill the bottle and prescribed "a large tablespoonful, or a common swallow, before each meal." It was likewise occasionally employed as a vermifuge for expelling worms. In addition, the inner bark was often used as a substitute for quinine in the treatment of intermittent fevers. It contains salicin which, when taken internally, is thought to decompose into salicylic acid, an aspirin-like compound. Today aspirin is much used not only for the relief of headaches but to reduce the aches and fever accompanying severe colds and other viral infections.

Salix L. Willow.

Over 1000 "species" of willows have been described, but when the forms, varieties, and hybrids have been properly identified, the number is reduced to some 300 or more extremely diverse species, mostly trees or shrubs of cold to warm-temperate regions of the northern hemisphere, over 100 of which occur in North America. *Salix* is the ancient Latin name of the willow, derived from the same root as sallow. They are fast-growing plants with bitter, astringent, aromatic bark and soft, light wood. In a number of species the limber twigs are jointed near the base and so snap off easily. The roots of the willows are remarkable for their toughness, length, and tenacity of life: They are not infrequently many times longer and larger than the stems which issue from them.

Male and female flowers are borne in elongate catkins on separate plants (dioecious) in early spring. Both styles and stamens are set on disks provided with nectar glands; unlike their relatives the aspens and poplars, the willows are therefore insect-pollinated, although wind probably also plays a significant part. The fruit is a flask-shaped seed pod containing numerous seeds winged with silky down for dissemination by the wind. Their vitality lasts but a day so they must fall on moist ground almost at once in order to germinate, but the willows have more than one method of developing new plants--twigs will root and grow if they fall on moist soil. In addition, many species produce sprouts or sucker shoots from the roots or from uprooted trunks.

The willows have been and are still widely used throughout the world by primitive and modern man for many and varied purposes, ranking among the first in any list of economic plants. When Caesar invaded England during the first century, he found the Britons defending themselves behind willow-woven shields and living in wattled huts made of willow twigs plastered with mud. The wood of the willow is soft, smooth, and light. In Europe, in both ancient and modern times, it has been applied to many uses for which, in this country, other woods are commonly preferred. The larger trees take the place of pine, and are sawn into boards and planks for the framework and flooring of buildings, which, when kept dry, are found to last for more than a century. It has also been used in building small vessels, for ladders, implements of husbandry, the lining of carts, and especially for use in works exposed constantly to water. Except in localities where trees are scarce, however, the wood is generally considered of value only for charcoal or fuel. As such, it is used in many parts of Europe, when dry making a quick, bright blaze with little smoke, but quickly burning out.

The branches and twigs have long been valued for their toughness, pliancy, and elasticity, of major importance in constructing household utensils, hoops, baskets, and wickerware; *S. viminalis* and *S. purpurea* are largely cultivated for this purpose. The cultivation of willows has been practiced for centuries in Holland, Belgium, Germany, and France, but it became an important industry in Great Britain only during the early 1800's. Nearly all arborescent willows, when properly cultivated, will yield shoots suitable for basketry and wickerware.

The bark of many species is tough and can be twisted into string, twine, or rope for use as harness, matting, fishnets, and lines. In Tartary, its fibers have even been spun and woven into cloth. In the late 1800's one writer related that in the Hebrides he had ridden with a bridle made of twisted willow twigs and lain at anchor with a cable made of the same material. The Indians of North America also made similar use of willow bark.

In pioneer days, farmers used the tough, supple, green twigs for binding fence rails together, as well as to fasten sharpened pegs to wooden frames to make primitive but effective harrows. Early immigrants settling in the Catskills as tenant farmers on Hardenburgh patent lands had little money to spend, so they made maximum and ingenious use of materials readily available. Knotted tight and seasoned, these twigs hardened and lasted for years. In some areas willow leaves are of importance as fodder for livestock, and the bark, being rich in tannic acid, has been employed in tanning leather.

Willows seem to find their most congenial habitat in swamps and along watercourses, where their tough, fibrous roots bind the soil of streambanks and help prevent erosion in times of flood, a most valuable service. In addition, many species are valued as ornamental plants, two of which, Weeping Willow and Crack Willow, have been much planted in the Catskills. The principal wildlife usefulness of willows is in the north, not only because the plants are more plentiful there but also because browsing and bud-using species are more common in that area. The buds and tender portions of small twigs are staple foods of several species of grouse and rabbits; elk, moose, and deer eat the twigs, foliage, and bark, as do beaver and the varying hare. In certain areas, honeybees depend upon pollen and nectar from willows for raising spring broods.

Dall, writing in 1897, stated that the half-digested willow-tips in the stomach of the adult deer were regarded as a delicacy by the Eskimos of the Yukon river. The bark of one species of willow has been mixed with oatmeal in times of scarcity. In China the leaves of willows are often eaten by poor people in times of want. Willow leaves have long been used to make a "sweet-tea," and around Shanghai the leaves of S. alba have been used to adulterate tea.

As with the poplars, the bark and shoots of some of the willows have been utilized in making dyes. A light rose-colored cinnamon can be obtained from the branches of the Sallow Willow, S. capraea, using a bismuth mordant, and bark of the same species produces an apricot yellow. By using wood in addition to the bark, a musk color will result.

The bark of a number of willows has been used in medicine since the time of Dioscorides, a Greek physician who described the medicinal properties of some 600 species of plants about 60 A.D. In colonial and later times willow bark was highly esteemed for its pain-relieving, astringent, and fever-lowering properties and was much used as a substitute for quinine in the treatment of intermittent fevers. Physicians were of course not then aware that the fresh bark contains salicin, a well-known pain killer, which in the human body appears to form salicylic acid, a substance chemically related to aspirin and known for its analgesic and febrifuge effects. Salicin from various species of willows was official in the U.S. Pharmacopeia, 1882-1926, and in the National Formulary, 1936-55; it has since largely been superseded by such synthetic preparations as aspirin and anacin, but the bark of S. alba is still in demand by some drug companies.

Many Indian tribes were also aware of the medicinal properties of willow bark. Western Indians used an infusion of the bark to induce perspiration in the treatment of colds and asthma. The roots were used for anthelmintic purposes and the inner bark as a febrifuge and sudorific. California Indians used willow bark for tea in the treatment of lumbago, while Indians of Arizona gave a decoction of willow leaves for fever. Other tribes utilized the root bark of willows in the treatment of such disorders as swellings on the back, headaches, and even for nosebleed, as well as for an emetic "to make one feel strong and healthy." Some tribes bathed in a boiled decoction of the roots and drank the liquid to ward off and cure fevers, while others drank a tea of willow bark to cure vomiting, remove bile from the stomach, and to cure colds. An infusion made from the leaves was sometimes administered internally to relieve headache and a decoction of the bark was applied externally as a remedy for sores and as a styptic. It will be noted that many of these medicinal uses of willow bark closely parallel those employed in Europe for centuries.

Salix viminalis, the Silky Osier, is one of the species of willows that have been in cultivation for some 2000 years, the long, limber twigs having been used in basketry and, in very early times, for construction of wattle huts. This species, propagated from cuttings, has been in cultivation so long that the basic stocks have become enfeebled, making them subject to ground vermin, fungoid and insect pests; only comparatively recently have stocks in Great Britain been improved by cross-fertilization, thereby strengthening their power to resist diseases. One might think also that this species might flourish with little attention on any poor, wet, marshy soil; but, as with any other crop, it responds best to careful husbandry and skillful cultivation.

Preparing willow twigs for market is quite a time-consuming process. Cutting and binding take place in early winter after the leaves have fallen, the crop being known as green whole stuff. The coarser withes are sorted, dried in the sun and wind, and stacked ready for market. In this state they are known as brown rods. The finer rods, after the "ragged," ill-formed ones have been discarded, are peeled or buffed. By one method, the twigs are left on the ground until spring advances, when the cambium begins a rapid growth, rendering it comparatively easy to remove the bark by drawing the rods through a handbrake of smooth, well-rounded steel framed in wood. Peeling is done chiefly by women, working from early May to the middle of July. After stripping, the rods are bleached in the sun and stored for sale or use at home.

Domville and Dunbar (1970) report that the Weeping Willow, *Salix babylonica*, has "locally spread from cultivation" in Ulster County. In the Catskill region, however, all specimens observed by the writer appear to have been planted.

Salix Key Based on Fruiting Characters

1. Flower scales pale or yellow, without dark tips (see also *S. depressa rostrata*), deciduous; mature capsules glabrous; aments leafy-peduncled, appearing with the leaves (petioles glandular above at apex, except for *S. nigra*), 2

  2. Aments stout, dense; blades serrulate (pedicel of capsule about twice length of upper gland), 3

    3. Blades ovate, short-acuminate; introd tree............ *S. pentandra*

    3. Blades lanceolate; native shrub (blades pale or whitened beneath; plant in flower Jun 10-30; fruit mature in late summer, Aug-Oct; mature capsules 7-9 mm long)......... *S. serissima*

  2. Aments slender, lax; leaves lanceolate, serrulate, 4

    4. Blades green beneath, linear-lanceolate, petioled; native trees; stamens 3-5 or more (flowers and capsules tufted in whorls along rachis of ament)......................... *S. nigra*

    4. Blades glaucous beneath, lanceolate; introd trees; stamens 2, rarely 6 and 7 (primary veins slender, closely spaced, parallel), 5

5. Young petioles viscid at summit; pistillate flowers with 2 glands; capsule short-pedicelled, conic, 5-6 mm long; leaves green on both sides, glabrous from the first, undulate-serrate, with 4-6 serrations per cm............... *S. fragilis*

5. Young petioles not viscid; pistillate flowers with 1 gland; capsules sessile, ovoid; leaves sericeous, with 7-9 serrations per cm (twigs yellowish)............... *S. alba* var. *vitellina*

1. Flower scales brown to black (yellow in *S. depressa* ssp. *rostrata*), persistent; capsules and aments various, 6

6. Capsules glabrous, pedicellate; scales black-tipped; aments leafy-peduncled, appearing with the leaves, sessile or nearly so; blades glabrous when mature (blades serrate, 4-12 cm long, glaucescent beneath).................................. *S. rigida*

6. Capsules permanently hairy; aments various, 7

7. Capsules silvery pubescent, 8

8. Capsules 5-8 mm long, on pedicels 2-4 mm long; aments broad, leafy-pedunculate (blades glabrous when fully expanded)... *S. petiolaris*

8. Capsules 2-5 mm long, subsessile; aments small, narrow, sessile, 9

9. Capsules 2-4 mm long, ovate; blades subopposite, glabrous, subentire............................... *S. purpurea*

9. Capsules 3-5 mm long, short-conic, blunt; blades silvery pubescent beneath, serrate, mostly narrowly lanceolate, 10

10. Twigs glabrous or glabrate; capsules densely sericeous....................................... *S. sericea*

10. Twigs canescent; capsules thinly sericeous..................................... *S.* x *myricoides*

7. Capsules white or gray woolly; aments subsessile, appearing in early spring before the leaves, 11

11. Pedicels 3-6 mm long; aments lax, short-pedunculate; scales linear, yellowish or pink-tipped; leaves rugose beneath, pubescent.................... *S. depressa* ssp. *rostrata*

11. Pedicels 1-3 mm long; aments stout, dense, sessile, 12

12. Catkins 25-50 mm long, not recurved; leaves coarsely veined, thick, glabrous; twigs glabrous; large shrubs of wet places, 2 to rarely 7.5 m tall.................................. *S. discolor*

12. Catkins 10-25 mm long, usually recurved; leaves pubescent-tomentose; twigs usually pubescent at tips and upper nodes; small shrubs of dry places, 0.5-3 m tall, 13

13. Shrub 1-3 m tall; leaves oblanceolate to narrowly obovate, 3-10 to 15 cm long, pubescent but usually becoming glabrate beneath....... *S. humilis*

13. Shrub 0.5-1 m tall; leaves narrowly oblanceolate, mostly entire, crowded, 2-5 cm long, pubescent on both sides............... *S. tristis*

Salix Key to Material with Mature Foliage (Including Sprouts)

1. Leaf margins revolute, not toothed, 2
    2. Leaves essentially hairless beneath (alternate, thin, not leathery, 3-4 times as long as wide, the upper surface glabrous or glabrate; plants 1-3 m tall).................. *S. humilis*
    2. Leaves and twigs gray-hairy (leaf bases deltoid), 3
        3. Leaves 3-10 or 15 cm long, 3-4 times as long as wide; plants 1-3 m tall.. *S. humilis*
        3. Leaves less than 8 cm long; plants 4-10 dm high (twigs 1-2 mm in diameter)...................................... *S. tristis*
1. Leaves toothed, margins not revolute, 4
    4. Leaves green and mostly hairless, neither whitened, white-hairy, nor gray-hairy beneath; leaf tips pointed, 5
        5. Leaves very narrow, not long-pointed (except sometimes in *S. nigra*), 6
            6. Leaf bases tapered; serrations coarse, 3-6 per cm; stipules small or lacking; buds sticky; petioles with glands just below base of blade..................... *S. fragilis*
            6. Leaf bases rounded; teeth close, 5-12 per cm; stipules conspicuous; buds not sticky; petioles without glands.. *S. nigra*
        5. Leaves wider and either moderately long-pointed or leathery, 7
            7. Leaves thick, rather leathery; leafstalks with glands near or on the leaf base.......................... *S. pentandra*
            7. Leaves thin, not leathery; leafstalks without glands (twigs hairless; leaves cordate or strongly rounded to base; teeth coarse, 3-8 per cm; stipules usually large and conspicuous)...................................... *S. rigida*
    4. Leaves gray-hairy or whitened or white-hairy beneath, 8
        8. Leaves gray-hairy at least beneath (leaves 2-3 times as long as wide, more or less egg-shaped, with short-pointed tips and tapering bases; twigs densely gray-woolly; leaves dull above)............................ *S. depressa* ssp. *rostrata*
        8. Leaves whitened or white-hairy beneath, 9
            9. Leaves subopposite, cuneate-oblanceolate, bluish-green tinged with purple, narrow, with teeth only near the tips; stipules early deciduous..................... *S. purpurea*
            9. Leaves alternate, 10
                10. Leaves toothed mostly above the middle; teeth mostly rather coarse, 11
                    11. Leaves narrow, 4-10 mm wide; serrations sharp, minute, 6-15 per cm; stipules early deciduous or obsolete................................. *S. petiolaris*
                    11. Leaves broader, 18-50 mm wide; serrations subcrenate, uneven, 1-4 per cm; stipules usually large and persistent.. .... *S. discolor*
                10. Leaves toothed to the base or nearly so, 12
                    12. Leaves silky, white-hairy, or woolly (at least beneath), 13
                        13. Twigs yellowish (more or less pubescent; capsules glabrous)............. *S. alba* var. *vitellina*
                        13. Twigs brown, 14

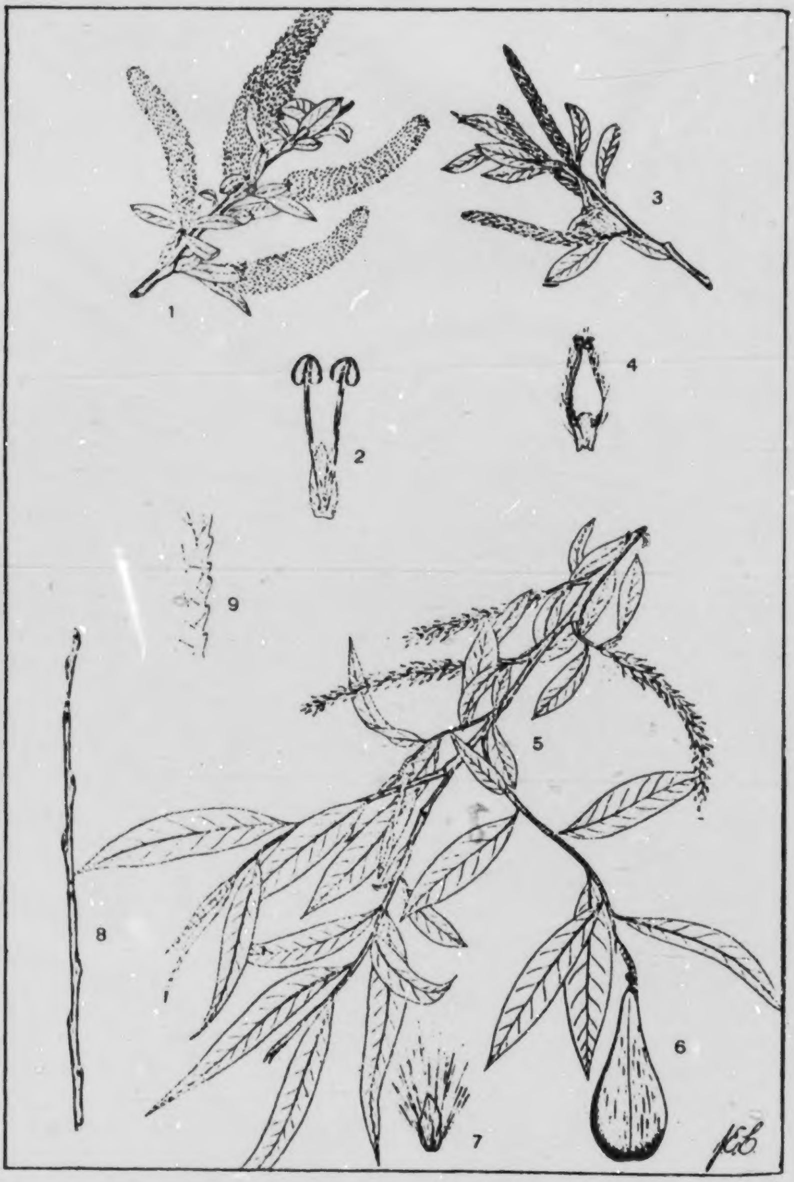
14. Twigs glabrous or glabrate; capsules densely
sericeous.. *S. sericea*
14. Twigs canescent; capsules thinly sericeous (stipules of
younger shoots small, not conspicuous; leaves tapering
at base; branchlets brittle, breaking easily)....... *S.* x *myricoides*
12. Leaves hairless, though whitened beneath, 15
15. Leaves firm, leathery, lustrous; leafstalks with
glands; shrub.. *S. serissima*
15. Leaves thin, not leathery, usually at least slightly
silky and dull above; leafstalks without glands;
trees.................................... *S. alba* var. *vitellina*

Sàlix álba L. var. *vitellìna* (L.) Stokes. Golden Osier.

Meaning of Species Name. White; var. name, egg-yellow.
Other Names. Golden Willow
Type of Plant. A large tree.
Habitat. In moist soil, especially along streams or on uplands; commonly planted in the e and esc sparingly along streams.
Range. NS to Ont, s to NC and Ia, w to Ida.
Distr in NYS. Frequent or common; natzd from Eu in early colonial times and now found in nearly all the thickly populated secs of the state.
Distr in the Torrey Range. Locally abundant as an esc from cult.
Time of Fl. Apr-May; May 5-20 at Cornell.
Origin. Introd from Eu.
Remarks. Introd in colonial times for the same purposes as *S. fragilis* and for medicine. This is our only willow with leaves silky-hairy above and below, though only the young leaves of var. *vitellina* usually show this character.

The wood of White Willow, as well as that of other arborescent species, has in Europe often been employed for the rafters of buildings, the lining of carts used in the transportation of stone, the construction of carriage bodies, wooden shoes, and artificial limbs as well as in turnery, in cooperage, and as charcoal in the manufacture of gunpowder. In many sections of Europe it is a common sight to see groves of White Willow from which long twigs are harvested yearly for use in the manufacture of such willow wares as baskets and wicker furniture. The stumps from which the long withes grow yearly are called "pollards" and the trees "pollarded willows." The strong vigorous shoots of pollarded trees are also used for hoop poles and stakes; and in several of the provinces of European Russia plantings were carefully made to produce the strong vigorous stems used in the manufacture of the shaft-bows of carriages. The leaves have afforded excellent forage for domestic animals, and the bark was employed in tanning leather and in medicine. The inner bark, though extremely bitter in the fresh state, when dried and powdered, has been used in the northern countries of Europe for making bread in times of scarcity. A yellow dye can be prepared from this species, but sources did not disclose what part of the tree was used.

The bark of this willow, containing tannin and salicin, is tonic and astringent and has been used as a substitute for quinine, particularly in treating intermittent fevers. This species was official in the *U.S. Dispensatory* of 1865, which stated that the bark could "be employed in substance



Salix alba var. vitellina--Golden Osier
[From Brown (1921), p. 116.]

or decoction, in the same doses and with the same mode of preparation as cinchona." Lighthall (n.d.) reported that it was a good tonic that could counteract periodicity. "I have often broke chills when recently contracted," he stated, "by taking the strong tea and giving it as hot as it can be swallowed every two hours." Its tonic and astringent combination rendered it useful in chronic diarrhea and dysentery and enabled it to check chronic bleeding from the bowels. It was also considered to make a fine poultice for varicose ulcers and sores.

One authority states that var. *vitellina* is more common in the eastern states than is the typical *S. alba*, both of which were introduced from Europe.

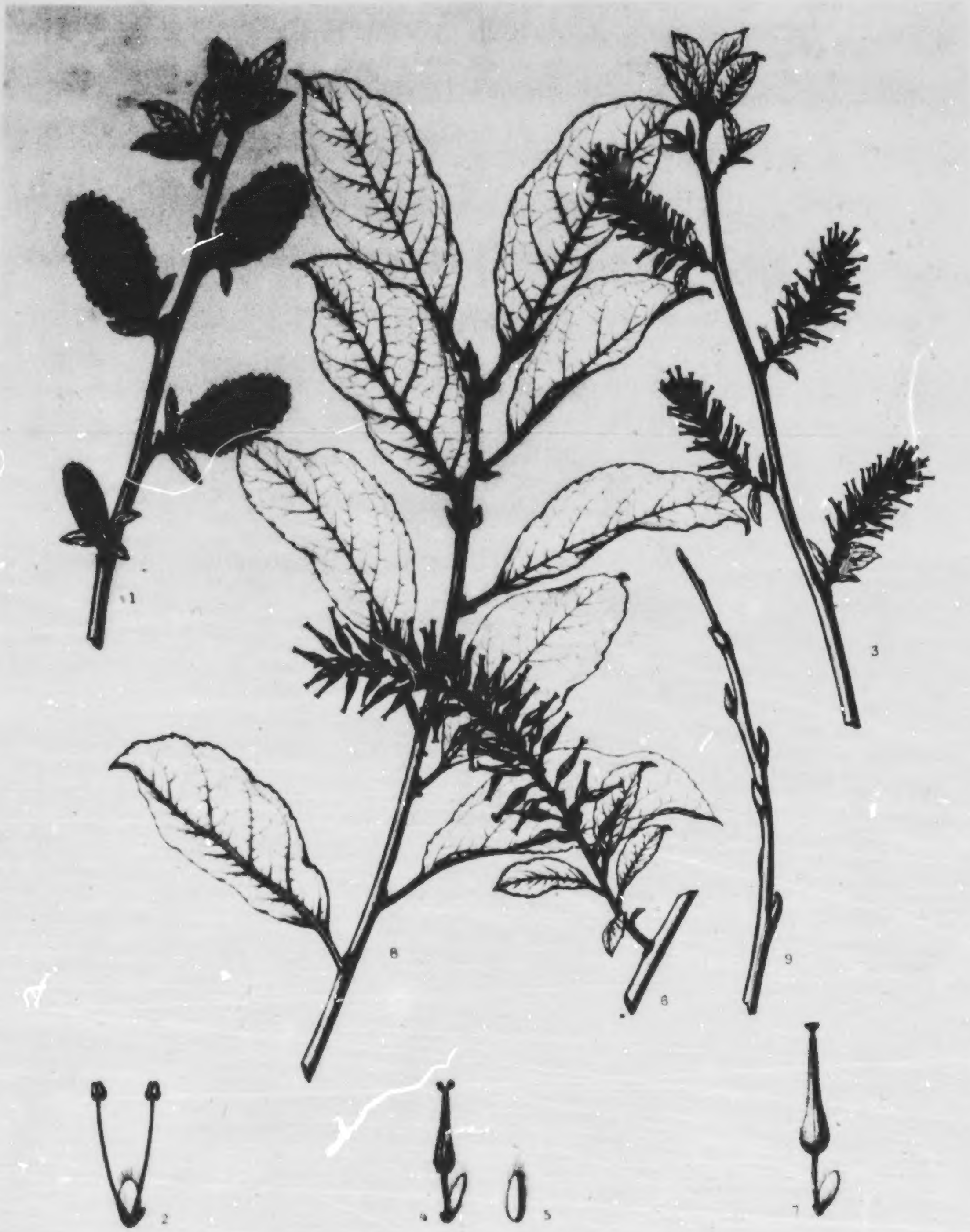
Sàlix depréssa L. ssp. *rostràta* (Anderss.) Hiit. Long-beaked Willow.

Meaning of Species Name. Low or depressed, from the typical arctic habit: ssp. name, beaked, referring to the fruiting capsules.
Synonyms. *S. bebbiana* Sarg. in Fernald (1950) and in Gleason (1952).
Other Names. Beaked Willow, Livid Willow, Bebb's Willow, Bebb Willow.
Type of Plant. A shrub 6-18 ft tall or sometimes a small tree 25 ft high, one of the widest-ranging and most variable species.
Habitat. In boggy and springy places, sometimes in rather dry soil or along streams and shores.
Range. Nf to BC and Ak, s to NJ, Pa, Neb. SD, and Utah, and in the w to NM and Cal.
Distr in NYS. Common northw and frequent or occasional southw to LI and westw across the state.
Distr in the Torrey Range. NY: Occasional on LI and in Bronx co, increasing northw; rare or perhaps adv on SI.
Time of Fl. Apr-May; Apr 20-May 15 at Cornell.
Origin. Native.
Remarks. Our only upright species with wide, often coarse-toothed, gray-hairy leaves somewhat tapering at tips and bases.

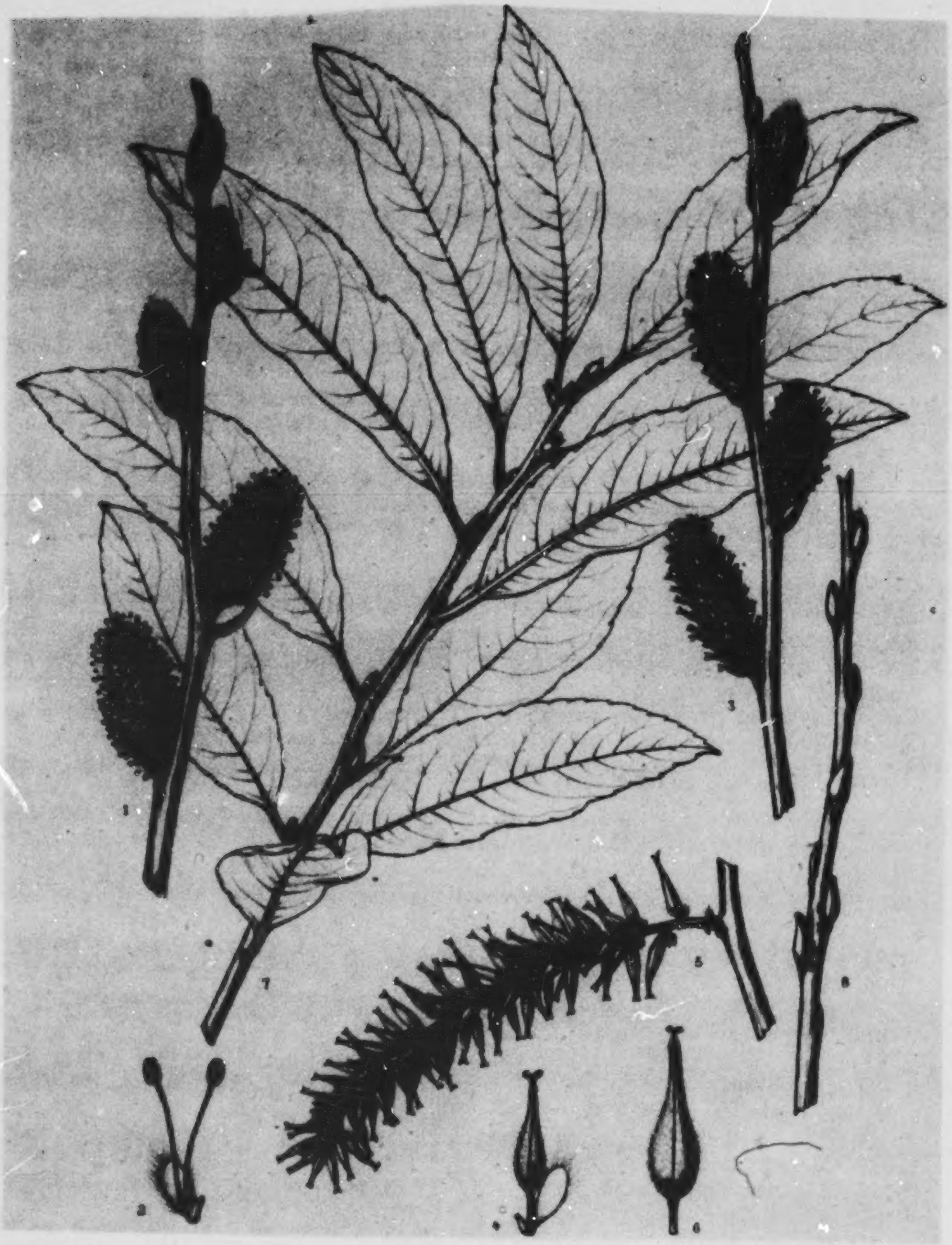
In the Catskills the Long-beaked Willow is usually a large shrub growing in a wide variety of habitats. Two distinguishing features of the undersides of the leaves are a distinct help in identification in the field; the young leaves are grayish hairy, and the intricately meshed veins on mature leaves stand out so prominently as to make distinct ridges easily felt by the fingers. This willow is of no commercial importance, but it might be useful in soil conservation work, as it thrives in a wide variety of soils, in many areas forming almost impenetrable thickets that help to bond the soil particles together, thereby preventing erosion. In the Rockies it grows to 10,000 feet in elevation. Perhaps, as Peattie (1950) suggests, "absolute uselessness to man is one of the most valuable assets a tree can possess!" In addition, such creatures as the cottontail rabbit gnaw on the bitter inner bark during the winter when other food is scarce, so it would seem that this willow is not entirely without value.

Sàlix discolor Muhl. Pussy Willow.

Meaning of Species Name. Particolored, from the leaves.
Other Names. Glaucous Willow, Silver Willow, Bog Willow, Swamp Willow, Large Pussy Willow.
Type of Plant. A large, few-stemmed shrub or small gray-barked tree, with a maximum height of 25 ft and a trunk diameter of 6-10 in.
Habitat. In swampy areas or on moist hillsides, often along streams and shores.
Range. Nf to James Bay, Alta, and BC, s to Del, Ky, Mo, SD, and Mont.
Distr in NYS. No specific comments given in House (1924).



Salix depressa ssp. rostrata--Long-beaked Willow
[From Sargent (1891-1902), Vol. IX, Plate 477, p. 131.]



Salix discolor--Pussy Willow
[From Sargent (1891-1902), Vol. IX, Plate 478, p. 133.]

Distr in the Torrey Range. Common throughout the range in some of its forms except in the pine barrens and e and s of them

Time of Fl. Apr-May; Apr 15-30 at Cornell.

Origin. Native.

Remarks. Stipules usually large and leaves toothed mostly above the middle with a rather distinctive leaf-tooth pattern; variable in leaf form and degree of pubescence. Wood soft, weak, yellow-brown; wt 27 lb per cu ft.

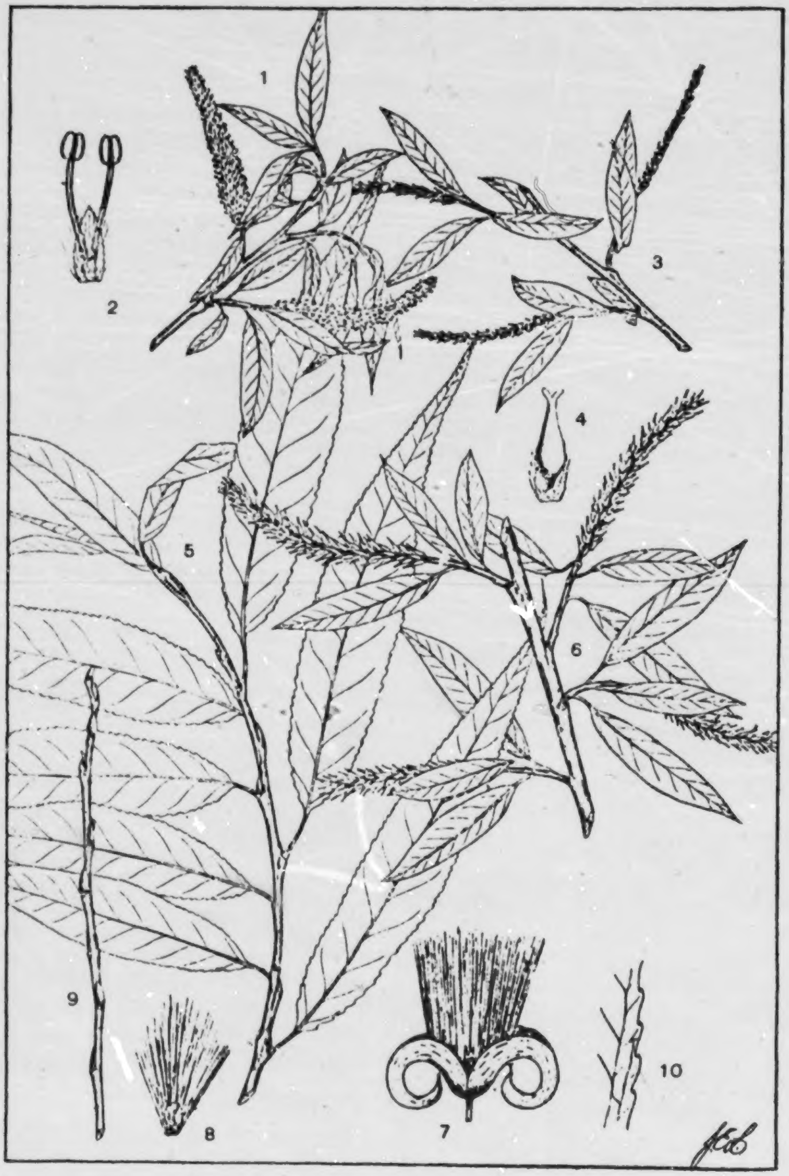
This is the familiar bog willow whose large gray, furry catkins appear long before the leaves during the first warm days of spring--the Pussy Willow known to practically every country child. In midsummer it is lost among the shrubby growth of the area in which it grows, but on a walk through a marsh in late February or early March, one may come by surprise upon the gray pussies just as they are pushing out from their brown scales, a definite indication that spring is on the way. If the twigs are cut and brought indoors, the color changes that mark the full development of the flower can be noted. "Turning them in the light," observes Rogers (1926), "one sees under the sheen of silky hairs the varied and evanescent hues that glow in a Hungarian opal."

In the Catskills this species is usually only a large shrub. It commonly grows in swampy areas along streambanks and on the edges of ponds and lakes, but it will also grow well if transplanted to drier soils. The wood is of no commercial value, but it is often planted as an ornamental not only because of its early spring blossoms but also because of its handsome foliage, the dark green of the upper surface contrasting markedly with the bluish-silvery undersides. In fall the leaves turn a buttery yellow before dropping.

Bees find use for this early-flowering willow, for its abundant pollen is produced at a time when other flowers are scarce. One therefore often sees the Pussy Willow swarming with bees gathering pollen to make pollen cakes. While the bees are no doubt somewhat useful in effecting pollination, it would seem that there is little about the female catkins to attract them, although they do bear nectar glands. In all probability more dependence is placed upon the wind as a pollinating agent, for the pollen is produced in such quantities that it sometimes drifts in swirls on the cold waters of a woodland pool.

The Potawatomis boiled the root bark of Pussy Willow and other willows for a tea used to stop bleeding.

Steyermark (1963) remarks that "The 'Pussy Willow' sold in florists' shops in early spring and planted as an ornamental shrub or small tree is a species from Europe and Asia, known as Goat Willow, *S. caprea* L." Its catkins are much larger and more fuzzy than those of *S. discolor*, and "only sparingly" does the Goat Willow escape from cultivation.



Salix fragilis--Crack Willow
[From Brown (1921), p. 114.]

Sàlix frágilis L. Crack Willow.

Meaning of Species Name. Brittle.
Other Names. Brittle Willow, Snap Willow, Stag's-head Willow, Redwood Willow, Varnished Willow.
Type of Plant. A tall tree attaining a maximum height of 80 ft and a trunk diameter of 7 ft, but usually only 50-60 ft high with a trunk 2-4 ft in diameter.
Habitat. Spread from cult to roadsides, pastures, borders of woods, and along streams.

Range. Nf, s to NJ and Ky.

Distr in NYS. Well est in the e part of the state and locally westw.

Distr in the Torrey Range. Frequent as an esc from cult in some parts of the range.

Time of Fl. Apr-May; May 5-20 at Cornell.

Origin. Introd from Eu.

Remarks. Introd from Eu in colonial times for ornament, sentiment, shade, and charcoal for use in the manufacture of gunpowder. The leaves resemble those of *S. nigra*, but those of this species have tapering bases.

This species produces timber superior to that of any other European willow. Johnson (1867) remarks that "It is very durable, both under water and when exposed to the air, and makes good fences, posts, and handles for various implements of husbandry.... When well seasoned, it makes excellent timber for houses, but must be kept dry and well ventilated; under these circumstances the wood has lasted upwards of a century with little injury." In the 1800's it was much used in Scotland for building small vessels, especially fast-sailing sloops of war, because of its lightness, pliancy, elasticity, and toughness. The wood, when dry, is easily distinguished from that of all other willows by its salmon color. It was therefore sometimes used in cabinet-making and for children's toys. In Great Britain it was much cultivated for use in the manufacture of baskets. The withy twigs have also been used there by market gardeners for bunching greens, turnips, and other produce. In southern Pennsylvania and Delaware it was cultivated in the last century as a pollard to produce charcoal for the important gunpowder works at Wilmington. The bark contains a large quantity of tannin and is probably little if at all inferior to that of the oak for tanning purposes. One authority remarks that the Indians used the bark of this species as an external remedy for sores and as a styptic. The early colonists also made medicinal use of the bark of this species as a substitute for quinine in the treatment of fevers, a practice brought from Europe, but Johnson (1867) states that "when used as an astringent that of the present species is probably equal to any other, but it does not contain as much salicin as *Salix Helix*, and is therefore likely to be inferior to the latter as a febrifuge and tonic."

Grimm (1966) states that *Salix nigra*, the Black Willow, is the large willow so often seen on bottomlands and along the banks of streams. In the Catskills, however, it is the Crack Willow that grows along the banks of both the east and west branches of the Delaware river and many of their tributaries. Many may well have been planted, but the brittle twigs snap off easily and are carried downstream, where they frequently lodge against the bank, take root, and develop into another tree.

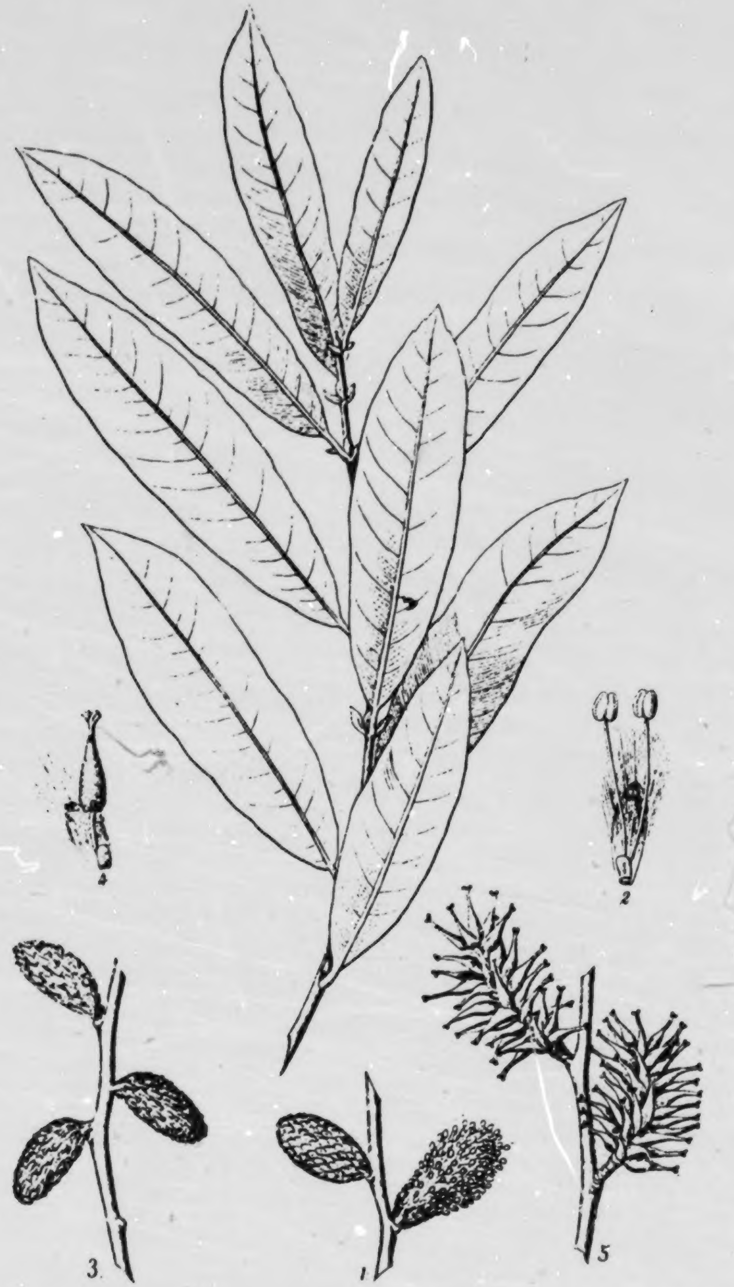
Sàlix hùmilis Marsh. Upland Willow.

Meaning of Species Name. Low.

Other Names. Small Pussy Willow, Prairie Willow, Gray Willow, Low Willow, Bush Willow, Dwarf Willow.

Type of Plant. A low shrub, 2-8 ft high.

Habitat. Dry thickets, open woodlands, barrens, and plains, often in sandy soil.



Salix humilis--Upland Willow
[From Emerson (1878), Vol 1, plate facing p. 294.]

Range. Nf and Que to ND, s to Fla and e Tex.

Distr in NYS. Frequent or common in the St Lawrence basin and southw to Tioga and Chautauqua co; rare and local eastw and southw in the e portion of the state.

Distr in the Torrey Range. Throughout the range, apparently decreasing in the pine barrens of NJ and LI.

Time of Fl. Apr-May; Apr 15-30 at Cornell.

Origin. Native.

Remarks. Highly variable, but its dry open habitat, the gray-green color, and the wedge-shaped leaf bases help to distinguish this species.

Vogel (1970) remarks that the Menominees used the roots of the Upland Willow for spasmodic colic, dysentery, and diarrhea, while the Meskwakis used a root tea of this species in an enema for flux.

Sàlix x myricoìdes (Muhl.) Carey. Myrtle-leaved Willow.

Meaning of Species Name. Resembling Myrica.

Type of Plant. A tall shrub.

Habitat. Streambanks.

Range. Found throughout the coincident ranges of its parents.

Distr in NYS. Rather frequent.

Distr in the Torrey Range. Not mentioned by Taylor (1915).

Time of Fl. Apr-May.

Origin. Native.

Remarks. A very common hybrid, according to Fernald (1950).

This reputed hybrid of S. rigida and S. sericea appears to have more of the characteristics of S. sericea than of its other parent. Mohlenbrock and Evans (1974) state that it "differs from S. sericea by its canescent twigs and thinly sericeous capsules, while S. sericea has glabrous or glabrate twigs and densely sericeous capsules."

Sàlix nìgra Marsh. Black Willow.

Meaning of Species Name. Black, perhaps referring to its dark-colored bark.

Other Names. Swamp Willow, Scythe-leaved Willow, Pussy Willow.

Type of Plant. A shrub or tree, usually attaining a height of 30-50 ft and a trunk diameter of 1 ft, but it sometimes reaches a height of 120 ft with a trunk diameter of 4 ft.

Habitat. Meadows and alluvial soils along streams and lakes, usually in wet soil.

Range. NB, Que, and Ont to Minn, s to Fla and Tex.

Distr in NYS. Common or frequent; said to be rare or introd in the pine barrens of LI.

Distr in the Torrey Range. Throughout the range, apparently decreasing northw; rare and introd in the pine barrens.

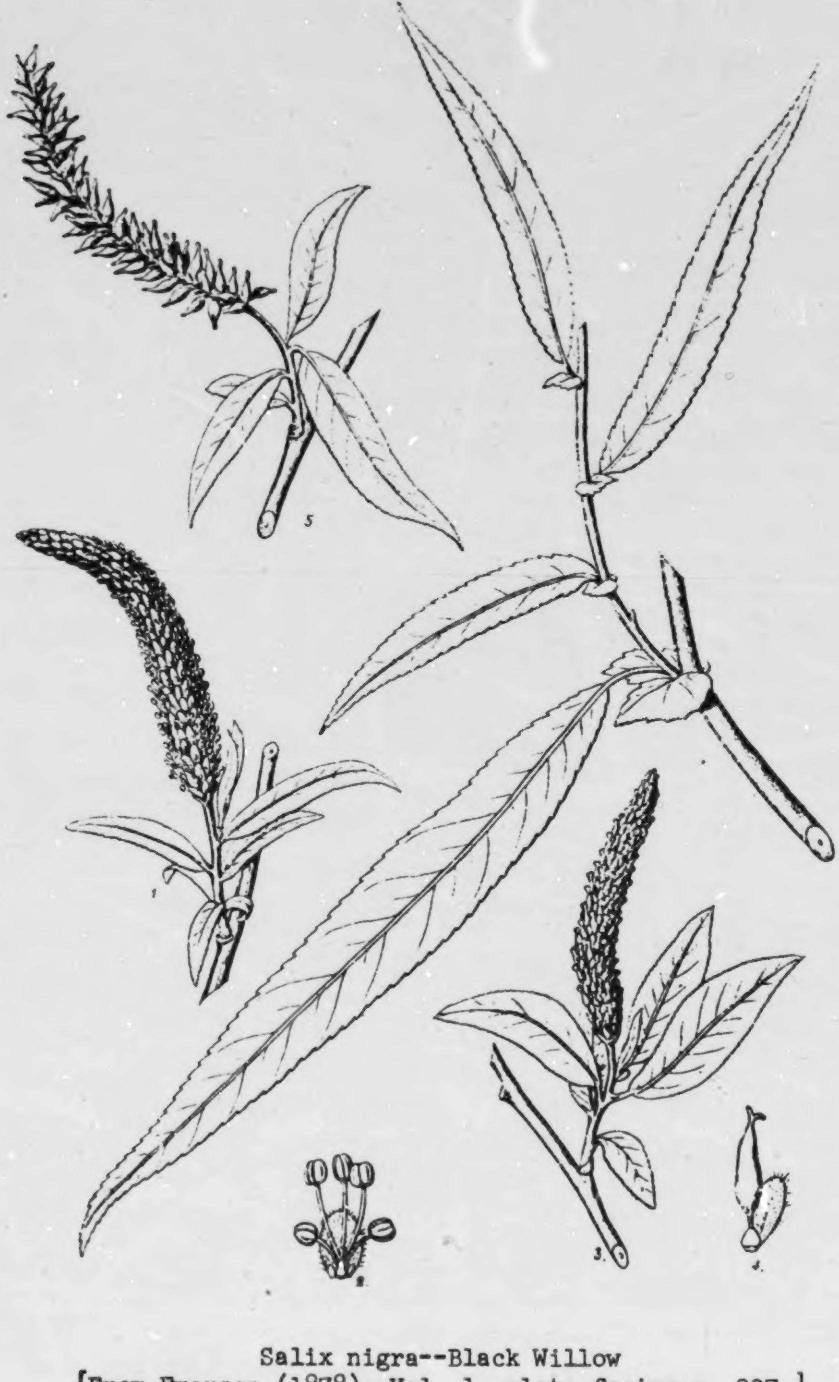
Elevation. Rarely found above 2000 ft in the Adirondacks.

Time of Fl. Apr-May; May 20-Jun 15 at Cornell.

Origin. Native.

Remarks. Wood soft, weak, light brown; wt 28 lb per cu ft, dry wt.

The Black Willow is the largest and tallest of any native species of willow in the United States and is the only one that can be considered of any commercial importance as a timber tree in this country. It has long, narrow,



Salix nigra--Black Willow
[From Emerson (1878), Vol. 1, plate facing p. 307.]

fine-toothed leaves with rounded bases, smooth except for the hairy glandless petioles. It is most abundant in the basin of the Mississippi, probably attaining its greatest size in southern Indiana and Illinois. Most of the willow lumber cut in the United States comes from Louisiana northward to southern Missouri and Illinois. The brittle branches are often broken off by winds and carried downstream by water, to become lodged along the banks where they can take root and grow, so it is also of great value in preventing the erosion of streambanks and as a ready source of wood for reinforcing levees along the banks of the Ohio, the Missouri, and the Mississippi. In the Catskills this species is comparatively rare and seems to prefer to grow in areas that are almost permanently wet or swampy.

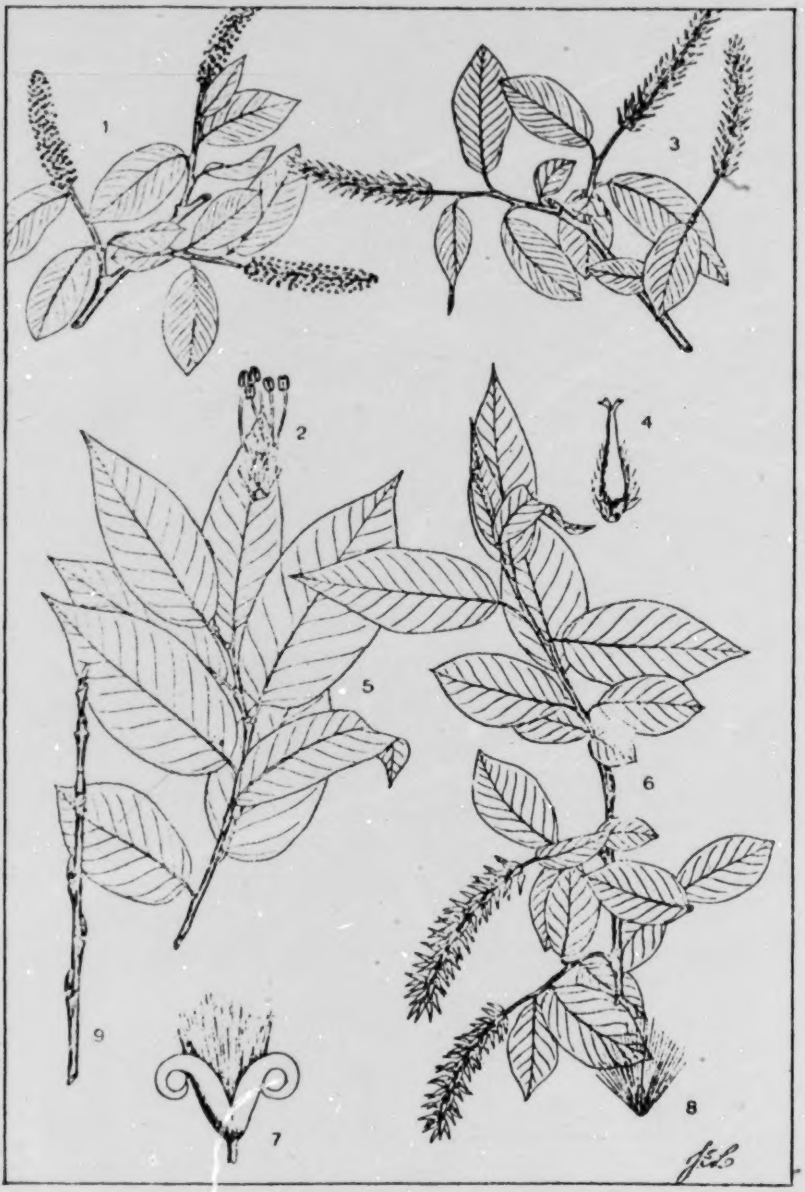
The wood of Black Willow is light in weight, moderately soft, and uniform in texture, but it lacks strength and checks badly in drying. It is probably the softest of all the eastern hardwoods, yet its springy fibers hold nails without splitting far better than most other woods. Steyermark (1963) remarks that "The wood does not warp or splinter, and is used in the manufacture of toys, packing cases, and some kinds of furniture where strength is not an item of importance ..." Being flexible, it is useful for wickerwork furniture and baskets as well as for boxes, crates, coffins, and artificial limbs. It was once poplar as a shade tree but it is no longer much used for this purpose. It makes good fuel and a high-grade charcoal that was much in demand during the days when black gunpowder was used in artillery shells and firearms, particularly in Revolutionary days.

This (and other willows) has served a variety of purposes in medicine, for the bark contains salicin, a white crystalline glucoside soluble in water and alcohol, used as a drug. Vogel (1970) reports that the Houma Indians used a decoction of the roots and bark of Black Willow for fever and for feebleness attributed to "thinness of the blood." In American medicine preparations made from its bark were prescribed in the treatment of gonorrhea, nocturnal emissions, and to relieve ovarian pain. It was also once considered an effective aphrodisiac as well as a sedative and astringent. The intensely bitter bark of the root likewise has been used as an ingredient in spring tonics to "purge the blood." In addition, the *U.S. Dispensatory* of 1865 states that "The younger Michaux speaks of the root ... as a strong bitter, used in the country for the prevention and cure of intermittents," and Seton later remarked that a decoction of the bark and root is the best substitute for quinine. The dried inner bark of this species is still in demand by drug companies processing pharmaceuticals.

Black Willow at one time furnished a light brown or rose-tan dye for wool, using an alum mordant, but sources did not indicate whether the inner bark or the young shoots were used; persons interested in natural dyes might well experiment with it.

Salix pentandra L. Bay-leaved Willow.

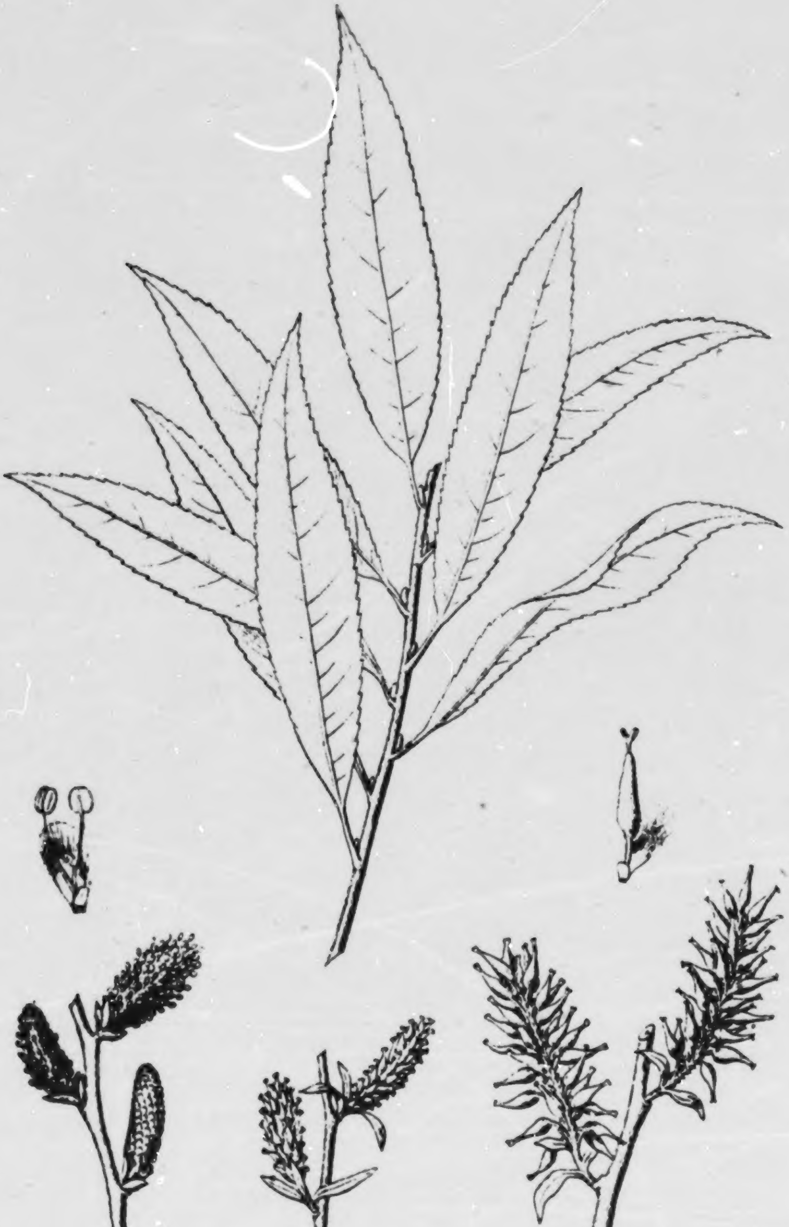
Meaning of Species Name. With 5 stamens.
Type of Plant. A shrub or small tree up to 20 ft high.
Habitat. Edges of fields near streams.
Range. NS to Ont, s to Md, O, Ill, and Ia.
Distr in NYS. Rarely esc or est in some localities.
Distr in the Torrey Range. Rare as an esc in the range.
Time of Fl. May-early Jun.
Origin. Introd from Eu.
Remarks. Spread from cult.



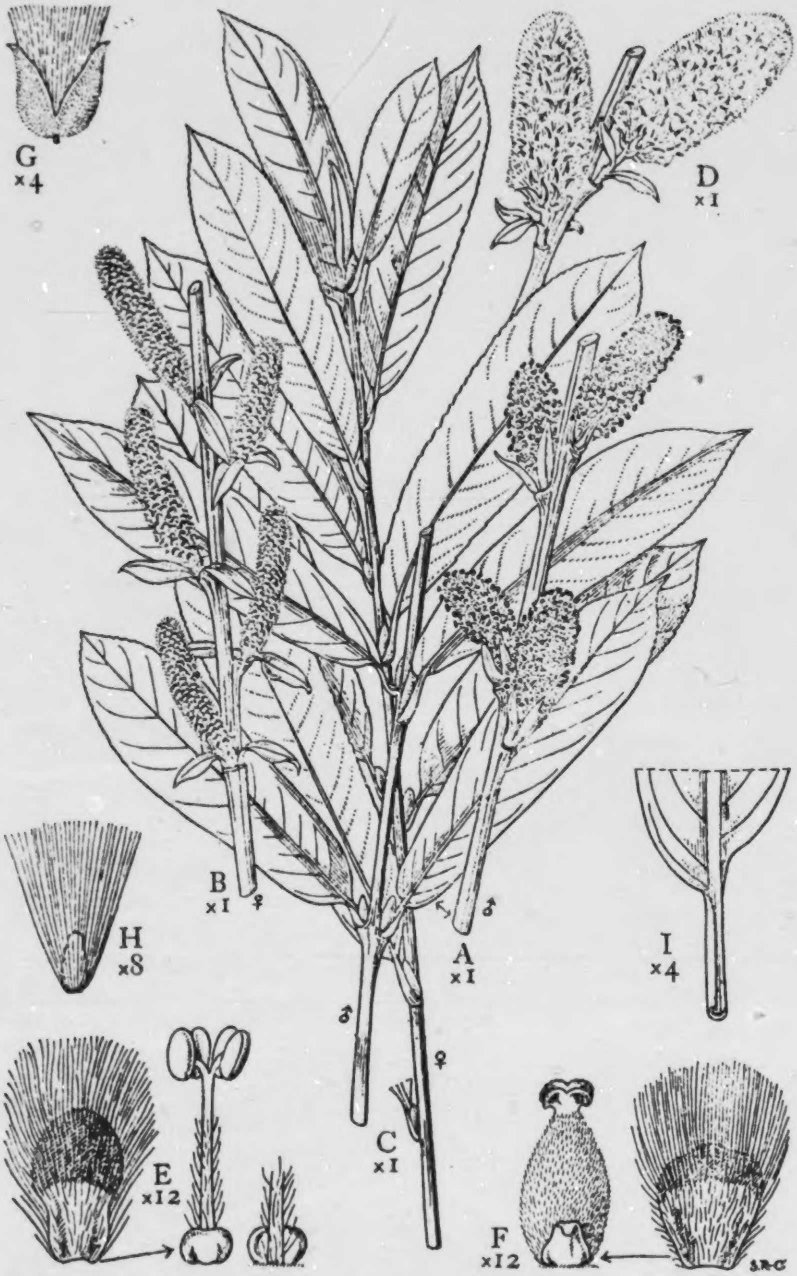
Salix pentandra--Bay-leaved Willow
[From Brown (1921), p. 110.]

Salix petiolaris J. E. Smith. Slender Willow.

Meaning of Species Name. Having petioles.
Synonyms. *S. gracilis* Anderss. var. *textoris* Fern. in Fernald (1950).
Other Names. Meadow Willow, Dark Long-leaved Willow, Petioled Willow.
Type of Plant. A clumpy shrub or a few-stemmed tree (northw).
Habitat. Moist meadows, swales, streambanks, swamps, and lake shores.
Range. NB to NJ, w to James Bay, Alta, Mont, Neb, and Col; sporadic in Va and Okla.



Salix petiolaris--Slender Willow
[From Emerson (1878), Vol. 1, 2d plate following p. 298.]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Salix purpurea--Basket Willow
[From Ross-Craig (1970), Part XXVII, Plate 25.]

Distr in NYS. Frequent across the state s to Dutchess and Orange co in the Hudson valley; infrequent westw to L Erie.

Distr in the Torrey Range. NY: Dutchess and Orange co, in the valley of the Hudson, increasing southw.

Time of Fl. Apr-May; Apr 15-May 15 at Cornell.

Origin. Native.

Remarks. Since Fernald's varietal name of *textoris* means "of the basket-maker," it is not unreasonable to infer that this species has been employed in the making of willow-ware.

Salix purpurea L. Basket Willow.

Meaning of Species Name. Purple.

Other Names. Purple Osier.

Type of Plant. A shrub 3-9 ft high.

Habitat. Low grounds.

Range. Nf to Ont and Wis, s to Va, WVa, O, Ill, and Ia.

Distr in NYS. Sparingly esc from cult across the state s of the Adirondacks.

Distr in the Torrey Range. Locally abundant as a roadside plant.

Time of Fl. Apr-May; Apr 20-May 10 at Cornell.

Origin. Introd from Eu.

Remarks. Widely planted in colonial times for basket-making. This species is remarkable among willows for the subopposite position of the buds, leaves, and catkins.

Of this species Johnson (1867) states that "Though the annual shoots are much shorter than those of several other kinds, seldom exceeding four feet in length, they are in great request for the finer descriptions of basket-work, being very slender, tough and flexible, and becoming very white when peeled. It is, therefore, occasionally grown in osier beds, but not much cultivated. The bark is so extremely bitter that rabbits and hares will not touch the plant; it is consequently adapted for forming close wattled fences around warrens, or gardens that require to be protected from their depredations."

Salix rigida Muhl. Heart-leaved Willow.

Meaning of Species Name. Stiff.

Other Names. Missouri Willow, Diamond Willow, Cordate Willow, Heart-leaf Willow.

Type of Plant. A shrub 5-12 ft high.

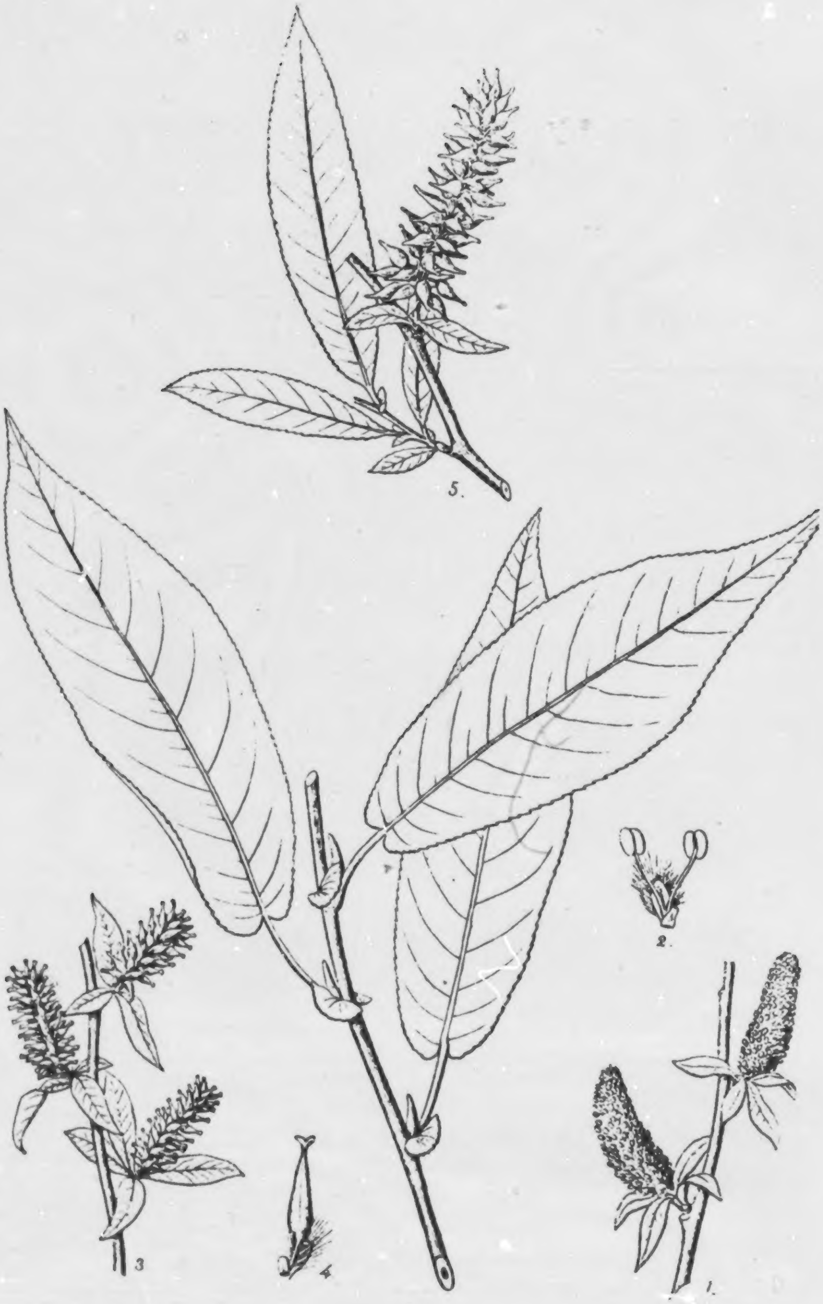
Habitat. Wet soil of low thickets, streambanks, ditches, and shores of ponds.

Range. NS and Que to James Bay, e Sask, and ne Mont, s to NC, Ky, Miss, Ark, Mo, Kan, and Neb; outlying stations in Ga, Ala, and Ark.

Distr in NYS. Throughout the state a common plant but rare in the pine barrens of LI and the higher Adirondacks.

Distr in the Torrey Range. Throughout the range in some of its forms except in the pine barrens and e and s of them.

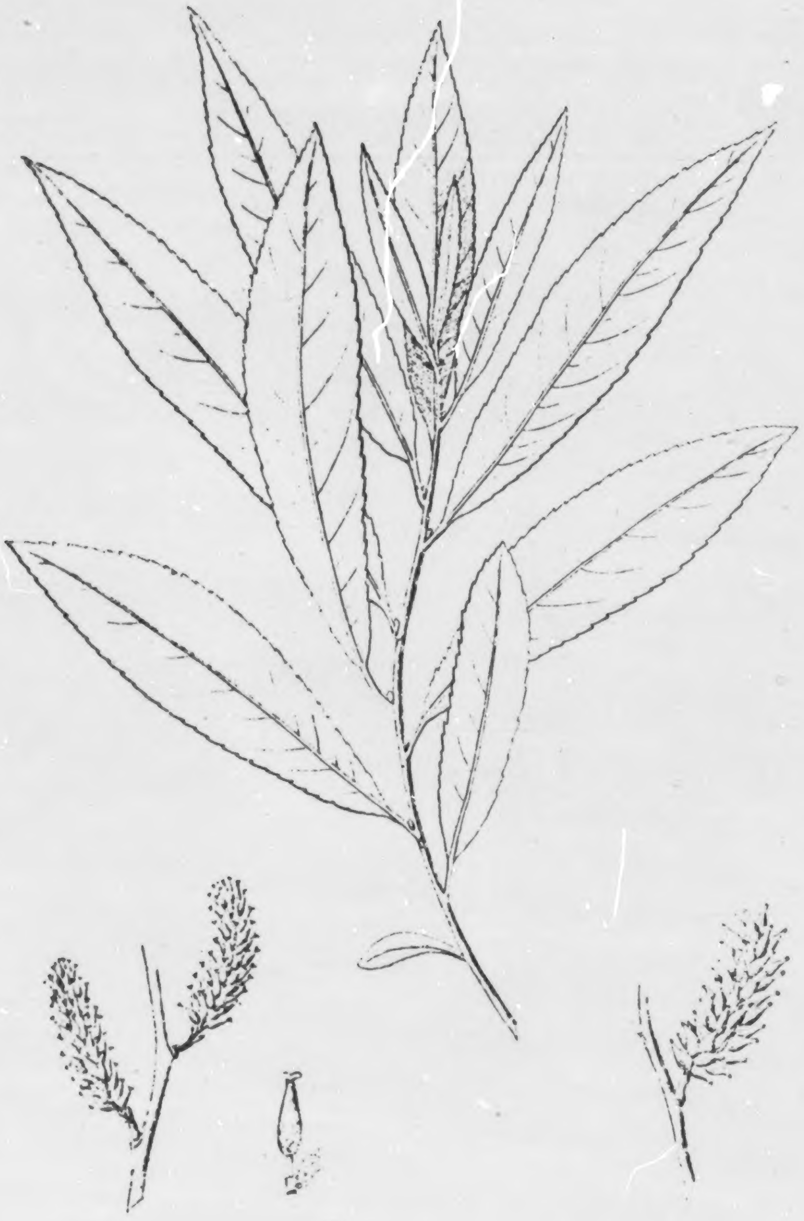
Time of Fl. Apr-Jun; Apr 20-May 10 at Cornell.



Salix rigida--Heart-leaved Willow
[From Emerson (1878), Vol. 1, plate facing p. 299.]

Origin. Native.

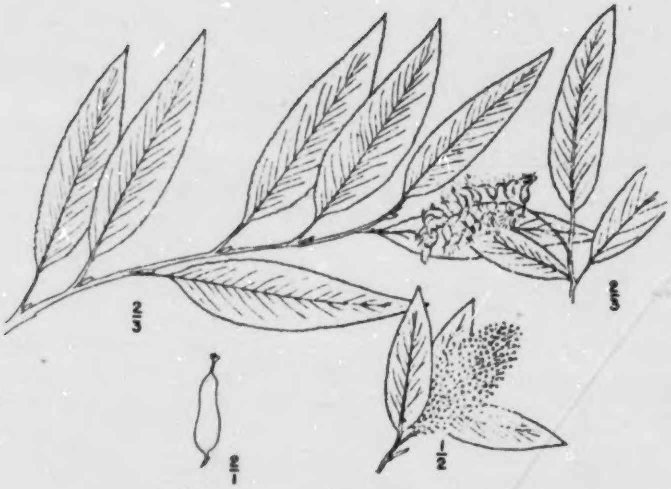
Remarks. This species has toothed leaves, green beneath, with moderately long-pointed tips and large stipules.



Salix sericea--Silky Willow
[From Emerson (1878), Vol. 1, plate facing p. 298.]

Sàlix serícea Marsh. Silky Willow.

Meaning of Species Name. Silky.
Type of Plant. A shrub or a small tree 5-12 ft high.
Habitat. Moist rocky ground, swamps, low thickets, and banks of streams, often in or near running water.
Range. NS and NB to Mich, Wis, and e Ia, s to Ga, Tenn, and Mo.



Salix serissima--Autumn Willow
[From Billington (1949), Fig 7, p. 66.]

Distr in NYS. Frequent in the northern part of the state; less common southw to Rensselaer, Ulster, and Tioga co and w to L Erie.

Distr in the Torrey Range. Throughout the range except the pine barrens and e and s of them.

Time of Fl. Mar-May; Apr 20-May 10 at Cornell.

Elevation. Has been collected at 1800 ft in Delaware co.

Origin. Native.

Remarks. This species has narrow, fine-toothed leaves, dark green above and very white-silky beneath.

Salix serissima (Bailey) Fern. Autumn Willow.

Meaning of Species Name. Very late, from its late habit of flowering.

Type of Plant. A shrub from 3-12 ft high.

Habitat. Bogs, swamps, marshes, and wet meadows.

Range. Nf and Que to Ak, s to n NJ, Pa, O, Ind, Wis, Minn, ND, Col, and Mont.

Distr in NYS. Frequent northw across the state, s to Tompkins co and westw to Genessee co.

Distr in the Torrey Range. Listed for Ct and NJ only in Taylor (1915).

Elevation. Sea level-690 ft in the Torrey range as reported by Taylor, but collected at an elevation of 1530 ft at Emmons Pond in Delaware co.

Time of Fl. Late May-Jun; Jun 10-30, fr Aug-Oct at Cornell.

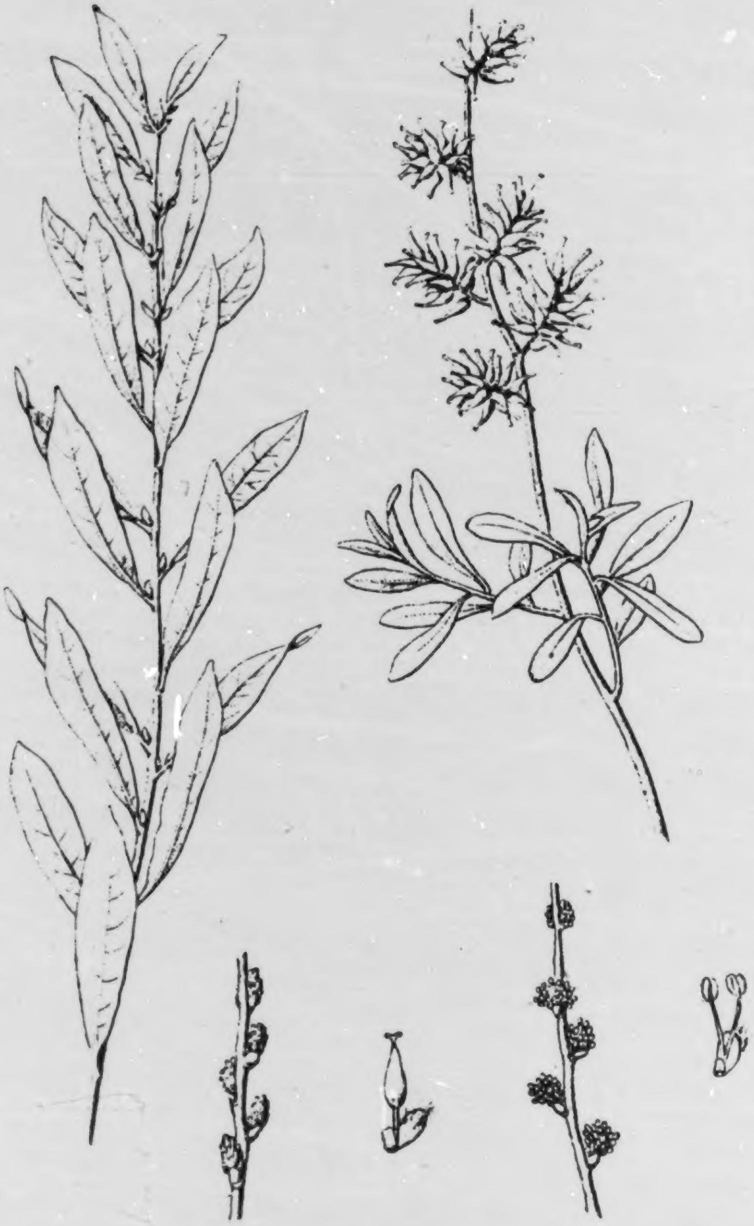
Origin. Native.

Remarks. A n plant of limy regions according to Wiegand and Eames (1926); our only willow with leathery leaves and glands on the leaf bases.

Salix tristis Ait. Dwarf Gray Willow.

Meaning of Species Name. Sad, probably because of its small size.

Other Names. Sage Willow, Dwarf Upland Willow.



Salix tristis--Dwarf Gray Willow
[From Emerson (1878), Vol. 1, plate facing p. 293.]

Type of Plant. A low, many-stemmed, leafy shrub 1-2 ft high.
Habitat. Dry barrens, sandy plains, uplands, and mountain balds.
Range. Me and Mass to Minn and ND, s to Fla, Tenn, and Neb.
Distr in NYS. Frequent on LI and SI.
Distr in the Torrey Range. NY: On LI and SI.
Elevation. Has been collected at 1800 ft in Delaware co.
Time of Fl. Mar-Apr.
Origin. Native.
Remarks. The small size usually separates it from *S. humilis*.

MYRICÀLES

This order, of obscure relationship to most other catkin-bearing orders, contains only one family, the Myricaceae, undoubtedly more closely related to the Juglandaceae than to other families, although Benson (1979) remarks that "It is possible that the order is of common origin with the *Hamamelidaceae* in the Rosales."

MYRICÀCEAE, the Bayberry Family.

The number of genera composing the Myricaceae is still unsettled. Early botanists recognized three genera, *Comptonia* (Sweet-fern), *Gale* (Sweet Gale), and *Myrica* (Bayberry). Some current authors treat the family as unigeneric, grouping the some 40 species under three subgenera of *Myrica*, as does Gleason (1952). Other authors, including Fernald (1950), recognize *Comptonia*, a monotypic genus, as generally distinct from *Myrica*. Members of this family can be distinguished from other catkin-bearing plants by their aromatic foliage, by the yellow glandular dots on the leaves, and, except for *Comptonia*, by their waxy-coated, 1-seeded fruits.

The leaves of Sweet Gale (*Myrica gale*) have often been dried and put in drawers to perfume linen, a use which may also help to keep moths out. In England the branches have been used as a substitute for hops in the manufacture of beer there called "gale beer," reputed to be most effective in quenching thirst. The berries, boiled in water, yield a wax utilized in the making of candles and soap. In Sweden and Wales, the bark is used in the preparation of a yellow dye. The Indians are likewise reported to have used this plant as a source of dye for coloring the porcupine quills used to decorate their costumes. The Swedes made a strong decoction of this plant to kill insects and to cure the itch. The nutlets have been used in France as an aromatic spice, and the French in Canada put the leaves in broth to give it a pleasant taste. In China the leaves are infused to make a tea used as a stomachic and cordial. This delicate and palatable tea is a much-reputed cure for colds in northern Maine, a treatment popular with children if not always effective.

In early fall and winter the fruiting branches of the Bayberry (*Myrica pensylvanica*) are covered with bunches of round grayish berries covered with wax, noted chiefly as the source of the wax used in making bayberry candles. The berries are collected in October or early November. When they are boiled in water, the wax floats to the top and can be skimmed off after the water cools and the wax hardens. This wax, harder and more brittle than beeswax, can be used in its pure state or mixed with tallow. Candles made from this wax, though quite brittle, are less greasy in warm weather, of fine appearance, slightly aromatic, and smokeless after snuffing, rendering them much more pleasant to use than those made of either wax or tallow, but they do not burn with as bright a light as do other candles. This wax has also been used for making sealing wax and soap. Soap made from it makes an aromatic and very softening shaving lather. In earlier days, also, bayberry wax was considered superior to any other kind for smoothing flatirons. Both leaves and berries make an agreeable substitute for the tropical bay leaves used for flavoring stews and other dishes. In addition, the leaves have been used with an alum mordant in the preparation of a gray-green dye for wool. Although one early American herbal, according to Coon (1960), states that "there is perhaps no form of disease in which the bayberry, if properly administered, will not prove beneficial," little medicinal use is now made of this plant. Although its bark enjoyed some popularity in domestic American medicine for its astringent and tonic properties, the root bark was official in the National Formulary for only 20 years, 1916-36. In suitable areas it makes an attractive landscape shrub, and its berries are relished by some 90 species of birds, including the bobwhite, pheasant, and wild turkey.

Comptonia L'Her. Sweet-fern.

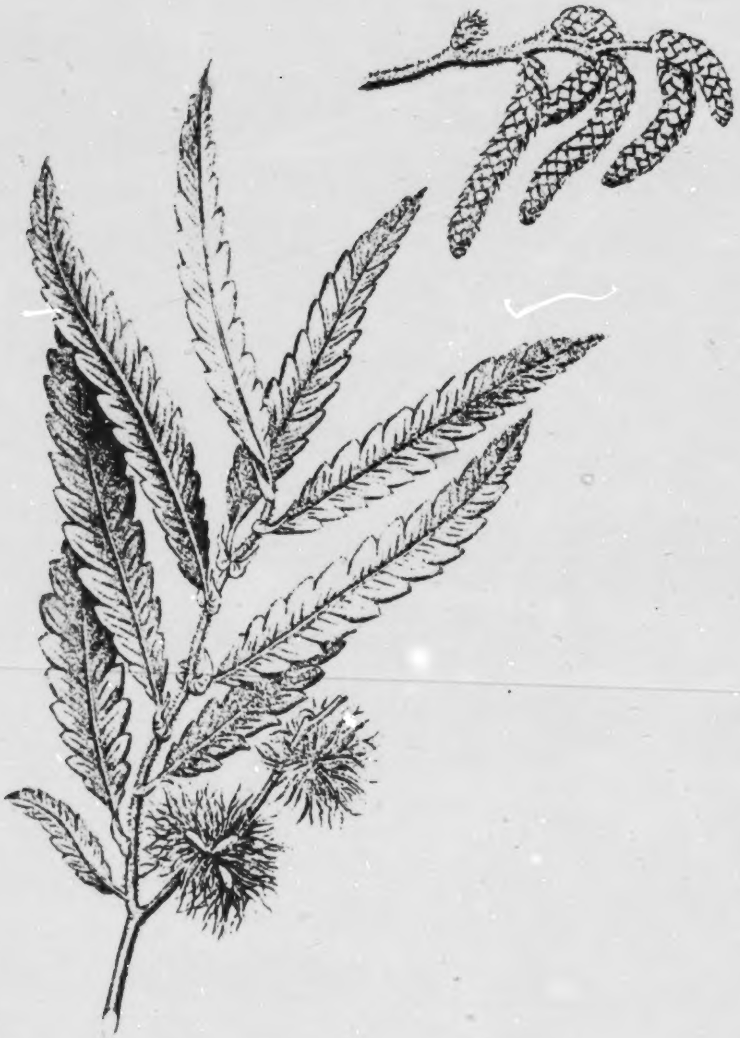
This is a low pubescent shrub, native to eastern North America, with fragrant foliage--long, round-lobed leaves that appear later than the flowers. The single species of this genus was named to honor Henry Compton, 1632-1713, Bishop of London, a patron of botany who introduced and cultivated many rare and uncommon plants.

Comptonia peregrina (L.) Coult. Sweet-fern.

Meaning of Species Name. Foreign--to the original European author.
Other Names. Fern-gale, Meadow-fern, Shrubby-fern, Sweet-bush, Sweet-ferry, Fern-bush, Spleenwort-bush, Canada Sweet-gale, Fernwort.
Type of Plant. A small hardy deciduous shrub 3-4 ft high with aromatic foliage, reproducing by seeds and creeping rootstocks.
Habitat. Open sterile hillsides, roadsides, clearings, neglected fields, and pastures in dry, often sandy soil.
Range. NS to Sask, s to NC, Ga, Ky, Tenn, O, Ind, Ill, and Minn.
Distr in NYS. Common on LI and SI, and locally northw to the n and c parts of the state; rather common throughout the Adirondacks and the sandy lowlands of c NY; less frequent or rare westw to L Erie.
Distr in the Torrey Range. Throughout the range.
Elevation. Grows to 2000 ft in Va.
Time of Fl. Apr-May; Apr 20-May 5 at Cornell.
Origin. Native.

Sweet-fern is a shrub with graceful, fernlike leaves that give off a pleasing spicy fragrance when crushed. The male flowers are borne in catkins while the female flowers occur in globular clusters; both are brownish white, more interesting than showy. The aromatic leaves and flowering tops are reported to have been dried and used as a substitute for tea during the American Revolution, a drink that is quite palatable and certainly worth some experimenting. During June and early July while they are still tender, the young nutlets are a popular nibble with country children.

"Although not now highly rated for any medicinal properties," states Coon (1960), "at one time considerable use was made of a decoction of the leaves for diseases requiring medicine of an astringent quality, considerable evidence being given of its value in cases of diarrhea. One old book indicates that during a 'bloody flux which prevailed as an epidemic in Rhinebeck (New York) in 1781, and swept off the inhabitants daily, an infusion of sweet



Comptonia peregrina--Sweet-fern
[From Emerson (1878), Vol. 1, plate facing p. 255.]

fern was employed with such success, that it was considered almost a specific. It produces perspiration without increasing the heat of the body.' Another well authenticated use for the plant has been as a remedy for worms." The Mohegans steeped the leaves in water and used the liquid as a cooling wash in the treatment of poison ivy. The leaves have also been a common ingredient in diet drinks.

Sweet-fern makes an attractive shrub that thrives in sterile acid soil of open, dry situations. It can be propagated by seeds sown in spring or fall and increased by division. The fernlike foliage is useful to cut for indoor decoration. In some areas, however, this species is considered an obnoxious plant, for Muenscher (1935) included it in his book on weeds. He suggests that it can be controlled by mowing close to the ground for two or three years, while individual plants should be dug out with a mattock, followed by the application of fertilizer and lime.

Martin *et al*. (1951) remark that the wildlife value of this plant is limited, but deer browse on it in the Alleghenies, ruffed grouse eat the nutlike fruits, and cottontail rabbits make minor use of it.

JUGLANDALES

This order consists of one family only, the Juglandaceae, the Walnut Family, distinguished in part from other catkin-bearing orders by the plants being predominantly monoecious and the leaves pinnately compound. Most botanists are agreed that this taxon is not the simple family that it was once considered, but ideas differ as to its relationship to other orders. One authority felt that the Juglandaceae might have evolved from one of the taxa in the Sapindales (a concept not supported by study of the wood anatomy), while another suggested that it may have been derived from the Rutaceae. Thorne (1973) placed both the Juglandaceae and the Myricaceae in his superorder Rutiflorae, under which he placed the Rutales, the Myricales, and the Leitneriales, with the Rutales containing three suborders--the Rutineae, the Sapindineae, and the Juglandineae.

JUGLANDÀCEAE, the Walnut Family

This is a small family of important trees consisting of six or seven genera and some 60 species, mostly of the north temperate zone, but one species ranges through Central America, south along the Andes to Argentina, and another extends from temperate Asia to Java and New Guinea. Both hickories (*Carya*) and walnuts (*Juglans*) are members of this family, one of the most important of all our native tree groups. Geological evidence indicates that prior to the Ice Age, both groups (but more especially *Carya*) were much more widely distributed throughout the northern hemisphere; today, members of this family are abundant only in eastern Asia and eastern North America. They are our only nut-bearing trees with long, aromatic, pinnately compound leaves arranged alternately along the branchlets. In North America, *Juglans* is the only genus of the family indigenous to the Pacific coast.

The hickories are distinct from the walnuts, yet they have many characters in common with them--the catkin-like flowers, nut fruits, hard resinous wood, aromatic sap, and leaves of many leaflets instead of a single blade. Their unisexual flowers appear rather late in the spring, both male and female flowers being borne in separate clusters on the same tree. Those that bear the male flowers are conspicuously clustered in fairly large drooping catkins and come from buds on twigs developed the previous year. The stamen-bearing catkins of the hickories are always 3-branched and quite slender; those of the walnuts are stouter and are never branched. The female flowers are not very large, and each one bears a small calyx and a pistil with two plumelike stigmas, ready to catch the wind-borne pollen. The hickories are in part distinguished from the walnuts by having mature husks that split into four valves, exposing the smooth nuts; the outside covering of the walnuts, on the other hand, is indehiscent, not cracking into sections.

The Juglandaceae are of major economic importance, for the wood of many species is of considerable commercial value. The Black Walnut (J. nigra) and the Persian or English Walnut (J. regia) are much used in cabinet- and furniture-making, while several species of hickory are prized for the making of tool handles. The English Walnut, Black Walnut, and the Pecan (Carya illinoensis) are valuable food nuts, and several genera are grown domestically for ornament. In addition, one genus is a highly valuable source of lumber in the orient.

The Indians had many uses for both walnuts and hickory nuts, regarding them so highly that they went to the trouble of planting them in fields near their villages. In his travels through Georgia in 1773, William Bartram reported passing cultivated fields of the Indians where, among other trees, both Black Walnut and Shagbark Hickory had been planted, stating that "these trees were cultivated by the ancients, on account of their fruit, as being wholesome and nourishing food. Though these [trees] are natives of the forest, yet they thrive better, and are more fruitful, in cultivated plantations, and the fruit is in great estimation with the present generation of Indians ..."

Lawson, in his History of Carolina, states that one of their dishes was a soup made of the pounded walnuts or hickory nuts (shells and all) mixed with the broth, "which dissolves the Nut, and thickens, whilst the Shell precipitates, and remains at the bottom." Thomas Ash, in his Description of Carolina, stated that the colonists' kitchens were frequently supplied with an oil from these nuts secured from the Indians, and that "whilst new it has a pleasant Taste; but after six Months, it decays and grows acid; I believe it might make a good Oyle, and of as general an use as that of the Olive, if it were better purified and rectified."

Parker (1910) reports that the Iroquois consumed large numbers of hickory nuts, walnuts, hazelnuts, chestnuts, beechnuts, and acorns during the fall months and stored large quantities for winter use. These nuts formed an important food source, particularly if other crops failed. Fresh walnuts and hickory nuts "were crushed in wooden bowls. The crushed meats were then thrown into a kettle of boiling water and the oil skimmed off. This oil was kept as a delicacy to be used with corn bread and puddings. Hickory and butternut oil were regarded especially palatable, the former being used for feeding infants. After the nut meats and oil were skimmed out the liquid was used as a drink. The crushed meats were often mixed with corn pudding or bread." Parker's description of the use of powdered nutmeats as baby food not only shows a considerable degree of sophistication on the part of the Iroquois but also gives some insight into the resourcefulness of a primitive culture: "In the early days dry butternut and hickory meats were pulverized in a mortar. This powder was thrown in a quantity of boiling water and used as a baby food. The nursing bottle was dried and greased bear-gut. The nipple was a bird's quill around which was tied the gut to give proper size. To clean these bottles they were untied at both ends, turned wrong side out, rinsed in warm water, thrown into cold water, shaken and hung in the smoke to dry.

The sap of both the walnuts and hickories is sweet, and when boiled

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makes a syrup or sugar by some considered as delicious as that of the maple. The trees should be tapped in early spring just before the leaves unfold. It is definitely recorded that the Indians used the sap of both the Black Walnut and the Butternut, and of the hickories at least the Shagbark Hickory furnished a delicious sugar. In addition, a number of species of walnuts furnished dye materials much used by the pioneers. Harlow (1957) had a novel idea concerning the use of our native walnuts and butternuts in the arts and crafts: "As seen in cross section, the nut [of the Butternut, as well as other walnuts and hickories] presents a design that might well be used ... as the basis for such woodcraft items as seals and watch fobs. Cross sections of the nuts themselves make attractive buttons."

Key to Local Genera of the Juglandaceae

1. Outer husk of fruit splitting into 4 valves at maturity; nut shell smooth, often angled; pith of twigs solid; terminal leaflets usually the largest; staminate catkins slender, in peduncled clusters, appearing on new season's growth; stamens 3-10.................... Carya
1. Outer husk of fruit not splitting at maturity; nut shell furrowed or corrugated; pith of twigs in transverse plates dividing the twigs into little chambers; medial lateral leaflets usually the largest; staminate catkins stout, solitary or 2-3 together, sessile, appearing on branchlets of the previous year's growth; stamens 10-40... Juglans

Carya Nutt. Hickory.

This genus of some 18 or 20 species of tall, fast-growing, deciduous trees comprises a most valuable group of timber- and nut-producing trees in eastern North America. This is now essentially an American genus, for only two others occur in east Asia and one in Mexico. The name of the genus is a modification of karua, the Greek name of the walnut. Flowers appear late in the spring as the leaves unfold, the staminate catkins hanging below the leaves near the base of the current season's growth, the pistillate ones in inconspicuous spikelike clusters near the ends of the branches on the same tree. Material for identification should include both fruit and mature leaves, for hybrid trees appearing intermediate between species are often found.

The hickories can be divided into three groups: (1) the pecan group, with an olive-shaped, thin-shelled nut; (2) the sweet hickories, including the Shagbark Hickory, with edible nuts and husks that promptly split into four valves at maturity; and (3) the pignuts, in which the nuts are usually bitter and the husks crack only above the middle or very tardily to the base. One representative of each group occurs in the Catskills. They have large compound leaves that give off an aromatic odor when crushed. In many species both the terminal leaflet and the upper pair are conspicuously larger than the lower pairs. The large, partially clasping leaf bases leave a conspicuous heart-shaped or 3-lobed leaf scar when they fall from the usually stout twigs. The nuts ripen in October and are disseminated largely by squirrels, which bury large numbers of them in the forest litter as a reserve food supply.

Indians of the southeastern states taught the early colonists many uses for the edible nuts of the hickories. After cracking the shells, they boiled the mixture, which gave them a rich, soupy liquid. Into this they stirred a coarse meal, made by grinding ripe corn between stones. The mush was cooked slowly, then made into cakes, which were baked on hot stones. From the crushed nuts the Indians also extracted an oil that one early writer said was beneficial for "Dolors and gripes of the Belly." In his History of Carolina, quoted by Sargent (1891-1902), Lawson described some of the ways in which the Indians prepared hickory nuts: "The Indians take these Nuts, and break them very small betwixt two Stones, till the Shells and Kernels are indifferent small; And this Powder you are presented withal in their Cabins, in little wooden Dishes; the Kernel dissolves in your Mouth, and the Shell is spit out. This tastes as well as any Almond. Another Dish is the Soup which they make of these Nuts, beaten, and put into Venison-Broth, which dissolves the Nut, and thickens, whilst the Shell precipitates, and remains at the bottom. This Broth tastes very rich."

Wood of the "true hickories" (excluding the pecan group) is strong, heavy, and elastic, unequaled by any other wood in strength and toughness combined with lightness; even the Indians knew its value and used it for the handles of their tools. Its defects are that it "shrinks much and irregularly, and therefore warps, that it is liable to attacks of worms, and decays rapidly when exposed to moisture." It is noted not only for its hardness but also for its toughness and ability to stand up under sudden shocks. For this reason it has long held first place in the making of axe handles, the running gear of wagons and carriages, handles of pitchforks, and the like. Emerson (1878) reported that American axes were known around the world not so much for their steel as for their hickory handles. He also remarked that the sport of trotting horses was developed in this country largely because of the invention of the light sulky, in the making of which hickory is indispensable. Emerson gives a clear picture of the importance of hickory in the economy of the 1800's:

> "Hickory makes the best screws, the smoothest and most durable handles for chisels, augers, gimlets, axes, and many other common tools. Seasoned wood of some varieties of the pignut and mockernut trees is equal in durability to ironwood or lignumvitae for mallets and heads of beetles, being tougher and more durable than white oak. The sailor prefers a hickory handspike. Its smoothness and tenacity recommend it for ... the rings ... which confine the sails of small vessels to the mast, and for the cogs of grist mills. The carriage maker employs it for the springs of gigs, the whiffletrees of stage coaches, and the shafts of light wagons. The farmer makes of it the teeth of his rakes, bows for his yokes, and handles for his axes; uses it, when white or yellow oak cannot be readily found, for axletrees, saws it into planks for barn floors, and applies it to many other purposes."

Hickory wood is also of value in the manufacture of skis, tool handles, agricultural implements, gunstocks, and chair backs, and heavy baskets made from thin strips of hickory wood are practically indestructible. It was also important as the best American wood for making walking sticks and barrel hoops, of which large quantities were once made in Massachusetts. It ranks high in fuel value and was preferred to that of any other wood, burning freely even when green, making a pleasant, brilliant fire, and throwing out great heat. Good charcoal can be made from it, being heavier than that from any other wood, but it was not considered more valuable than that of birch or alder. The ashes of the hickories were also considered better for the purpose of making soap than any other native wood, being ranked next to those of the apple tree.

While several species of hickory have nuts with edible kernels, the Pecan (*C. illinoensis*), a native of the south-central states, is by far the most important. It is now widely cultivated in a number of improved varieties in many of the southern states. The nuts are easy to eat out of the shell, and large quantities are used in baked goods and confectionery. The nuts of most species are eaten by domestic swine, squirrels, chipmunks, black bear, gray fox, white-footed mice, and opossums, and the twigs are browsed by rabbits and deer. Hickory nuts have been found in the stomachs of several of the larger birds, including grouse, wild turkey, quail, blue jay, ring-necked pheasant, and the wood duck. Crushed green nut husks were formerly used, particularly by the Indians, to poison fish for food, but this practice is now illegal.

The leaves of most of these trees are somewhat aromatic and astringent, the bark is astringent and bitter, and both leaves and bark no doubt possess medical virtues. As reported in the *U.S. Dispensatory* for 1865, Mr. Stearns of Michigan "found great advantage from chewing the inner bark of the hickory in dyspepsia and has used a tincture made from the same bark with great success in the treatment of intermittent fever. The use of the remedy has extended in his neighborhood, and many employ it habitually in the same complaint ..."

Key to Local Species of *Carya*

1. Buds completely yellow-scurfy, flattened; leaflets mostly 7-9, usually narrow; husk very thin, splitting slightly more than halfway; meat very bitter; bark tight........................ *C. cordiformis*
1. Buds brown or gray, not scurfy, though sometimes with yellow scales; leaflets mostly 5-6; meats usually sweet, 2
   2. Terminal leaflet usually much larger than the upper pair of lateral leaflets; teeth (many of them) of leaflets with dense subterminal tufts of hairs; leaflets 5, rarely 7; twigs stout, usually somewhat pubescent; terminal bud dark brown, the outer scales rather loose and pubescent on the surface, often keeled and projecting into a point, 13-22 mm long; husk of fruit very thin, splitting to base; nuts white, angled, thin-shelled; bark of older trees shaggy......................... *C. ovata*
   2. Terminal leaflet about the same size as the upper pair of lateral leaflets; teeth glabrous or ciliate, without special tufts of hairs; leaflets 5-7; twigs rather slender, smooth and lustrous; terminal bud reddish brown, lustrous, the scales rather close-fitting, 7-12 mm long; husk thin, finally splitting only to middle or sometimes by one suture to near base; fruit dark brown, shining, smooth; bark tight.............. *C. glabra*

Carya cordiformis (Wang.) K. Koch. Bitternut Hickory.

Meaning of Species Name. Heart-form, from the shape of the nut.

Other Names. Pignut, Swamp Hickory, Bitter Pignut, Bitter Hickory, Pig Hickory, Pig Walnut, Bitternut, Bitter Walnut, Bitter Pecan Tree.

Type of Plant. A slender tree sometimes 100 ft tall with a trunk 3 ft in diameter, but usually only 50-75 ft high with a trunk 1-2 1/2 ft in diameter.

Habitat. Wet to dry woods, along streams, and in swamps.

Range. S Que to Mich, Wis, and Minn, s to Fla, Tex, and se Neb.

Distr in NYS. Common in most secs of the state; rare or absent from most portions of the Adirondacks above 1500 ft and from the higher Catskills, and not reported from the pine barrens of LI.

Distr in the Torrey Range. Throughout the range except in the pine barrens of NJ and e and s of them; wanting in the pine barrens of LI, increasing northw.

Elevation. Grows to 3500 ft in Va.

Time of Fl. May-Jun, fr Sep-Oct; fl May 25-Jun 10 at Cornell.

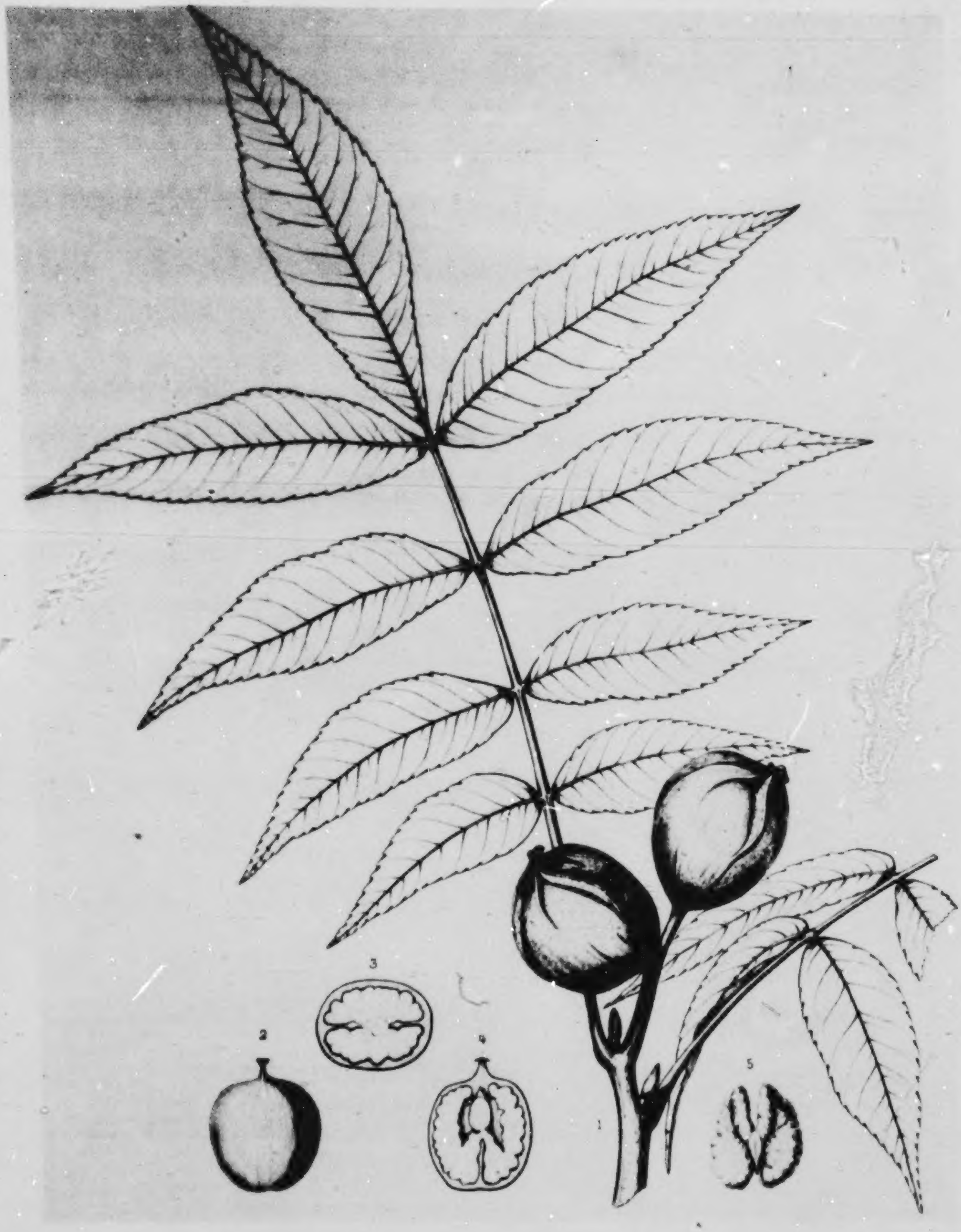
Origin. Native.

Remarks. Wood hard, strong, dark brown; wt 47 lb per cu ft. This species can be distinguished from all other native trees by its bright yellow granular buds.

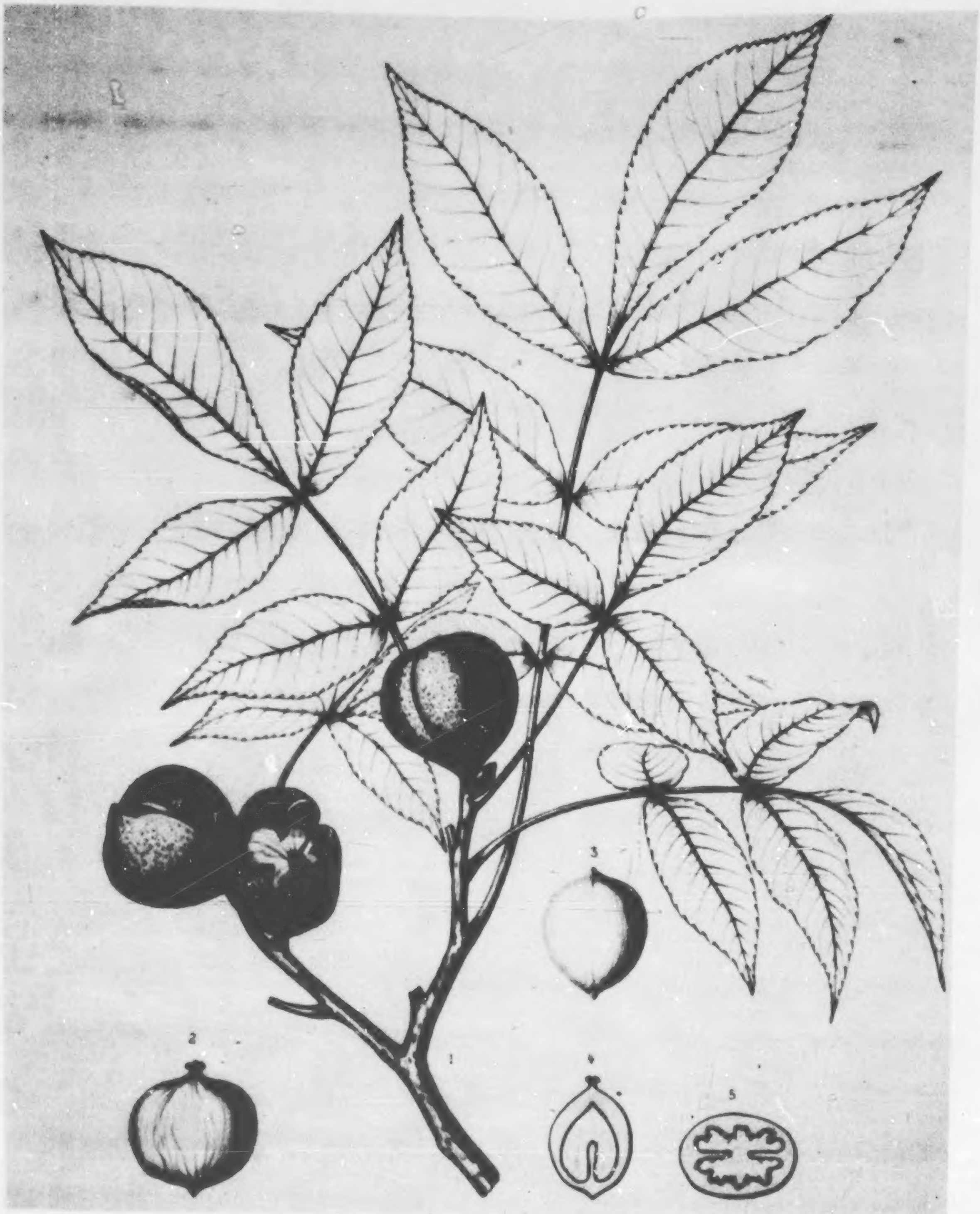
The Bitternut Hickory ranges farther north than any other species of hickory and is the only member of the pecan-hickory group to be found in the northeastern states and adjacent Canada, reaching its best development in the Missouri and lower Ohio valleys. Its twigs are unusually fine and slender for a hickory, and in winter its almost vaselike dome makes a delicate pattern against the sky. If its nuts were not so intensely bitter that even the squirrels usually ignore them, it would make a fine lawn tree. In spite of their acrid flavor, however, the early settlers found a use for these nuts, expressing from them an oil which they burned in their crude lamps and which they used as a remedy for rheumatism.

Although the wood of this species is somewhat inferior to that of the "true hickories," being slightly lighter, less stiff, and not quite so strong, it has generally been used for the same purposes, particularly for agricultural implements, striking tools, wagon parts, hoops, crates and boxes, and even for flooring and furniture, as well as for fuel and for smoking meats. Steyermark (1963) remarks that "the shaved bark has been used by manufacturers under the name of 'yellow-bud' hickory for the making of chairs with split bottoms."

For a hickory, this species has a short life, a matter of some 200 years, but its seedlings are able to endure dense shade for many years. Since it grows more rapidly than most other hickories and since its wood is useful, foresters have granted it a place in forest management. As other hickory timber becomes increasingly scarce, the Bitternut Hickory is therefore likely to play an increasingly important economic role.



Carya cordiformis--Bitternut Hickory
[From Sargent (1891-1902), Vol. VII, Plate 341, p. 141.]



Carya glabra--Pignut Hickory
[From Sargent (1891-1902), Vol. VII, Plate 353, p. 165.]

Càrya glàbra (Mill.) Sweet. Pignut Hickory.

Meaning of Species Name. Smooth.

Other Names. Pignut, Brown Hickory, Red Hickory, White Hickory, Black Hickory, Broom Hickory.

Type of Plant. A medium to large-sized tree, sometimes 120 ft tall with a trunk 5 ft in diameter, but usually only 50-60 ft high with a trunk 1-3 ft in diameter.

Habitat. Dry or moist woods of uplands and on slopes.

Range. Vt to Mich, Ia, and Kan, s to Fla and Tex.

Distr in NYS. Frequent or common throughout most secs of the state except the Adirondack reg, where it occurs only at lower elevations and in the lower valleys and foothills.

Distr in the Torrey Range. NY: Throughout, increasing northw.

Elevation. Sea level-1000 ft in the Torrey range, as reported by Taylor (1915); yet he collected a specimen of this species near Stamford in 1909 at 1800 ft.

Time of Fl. May-Jun, fr Oct-Nov; fl May 20-Jun 15 at Cornell.

Origin. Native

Remarks. Wood hard, strong, tough, rather dark brown; wt 51 lb per cu ft. Distinguished from the Shagbark Hickory by its smooth bark, small end buds, and small end leaflets.

When grown in the open, this hickory is a graceful, symmetrical tree with spreading limbs that end in delicate pendulous branches, an ornament to any park, even in the dead of winter. Rogers' (1926) description of this tree is particularly apt: "In summer the tree laughs in the face of the sun, its smooth, glossy, yellow-green leaflets lined with pale green or yellow. In spring the clustered fringes among the opening leaves are the green and gold male flowers. The curiously angled fertile flowers, at the tips of twigs, are green with yellow stigmas. Autumn turns the foliage to orange and brown, and lets fall the pear-shaped or rounded fruit, each nut obscurely four-angled and held fast at the base by the thin, 4-ridged husk that splits scarcely to the middle. The kernel is insipid, sometimes bitter, occasionally rather sweet." The leaflets often fall off separately in autumn, leaving the leafstalks clinging to the tree like so many yellow darning needles.

Like most of the other hickories, its wood is heavy, hard, tough, flexible, strong, and close-grained, equaled only by that of the Shagbark Hickory (from which it is not distinguished commercially). Stronger than steel, weight for weight, as well as being more elastic, less brittle, and less heat-conducting, it is a remarkable wood. Because of its low conductivity of heat, it was formerly much used for the hubs of wagon wheels, where the heat of friction might be great, and for singletrees, which must often endure sudden strains. It should therefore not be surprising that covered wagons rolled westward equipped with hickory hubs and hickory felloes. It would also withstand the terrific vibration of textile looms, so its wood also played an important part in their construction. It was the preferred wood for the axletrees of carts and wagons, the heads of mallets and beetles, and the handles of axes. "A beetle made of it," states Emerson (1878), "and used to drive stakes and iron wedges, outlasts, I am told, any that can be made of any other wood, foreign or native." As a fuel it was ranked next to Shagbark Hickory and was considered superior to all other wood.

In earlier days farmers used to turn their pigs into the woods to fatten on beechnuts and acorns, among which were often found the fruits of this species. The pigs eagerly devoured their thin-shelled nuts, so the tree earned the name by which it is commonly known today--not necessarily because the nuts were fit only for the pigs but more because they sought them out. Its name of Broom Hickory also comes from an earlier day when brushes and brooms were made by the early settlers from this species. The raw material for a broom was a small hickory sapling, from which "splits" were stripped up for 8 to 10 inches with a jackknife, bent back, and held down with the left hand. When the wood at the heart was reached (too brittle to strip), it was cut or sawed off. The splits were then turned forward and tied with a tow string made for the purpose on the spot. There remained only the matter of reducing the pole above to the right length to make a suitable handle. The "scrub" was a short hand-broom made in exactly the same way but from a smaller sapling. Our forefathers spent many a rainy day and winter night on such homely tasks.

Steyermark (1963) notes that "This species is considered to be one of those of the genus responsible for causing hay fever."

Carya x laneyi Sarg. Laney's Hickory.

This hybrid between C. cordiformis and C. ovata is not too uncommon in areas where the two parents grow together, but it has been collected only once in the Catskills.

Carya ovata (Mill.) K. Koch. Shagbark Hickory.

Meaning of Species Name. Ovate, from the shape of the fruit.

Other Names. Shagbark, Shellbark Hickory, Walnut, Sweet Walnut, White Walnut, Kingnut, Upland Hickory, White Hickory, Red-heart Hickory, Shellbark, Scaly-barked Hickory.

Type of Plant. A large tree sometimes 120 ft high with a trunk diameter of 4 ft but usually only 70-90 ft tall with a trunk 1-2 ft in diameter.

Habitat. Rich woods, bottoms, and slopes.

Range. Que to s Ont and Minn, s to Fla, Kan, and Tex.

Distr in NYS. Common throughout most secs of the state outside the Adirondack reg and the higher Catskills; not reported from the pine barrens of LI.

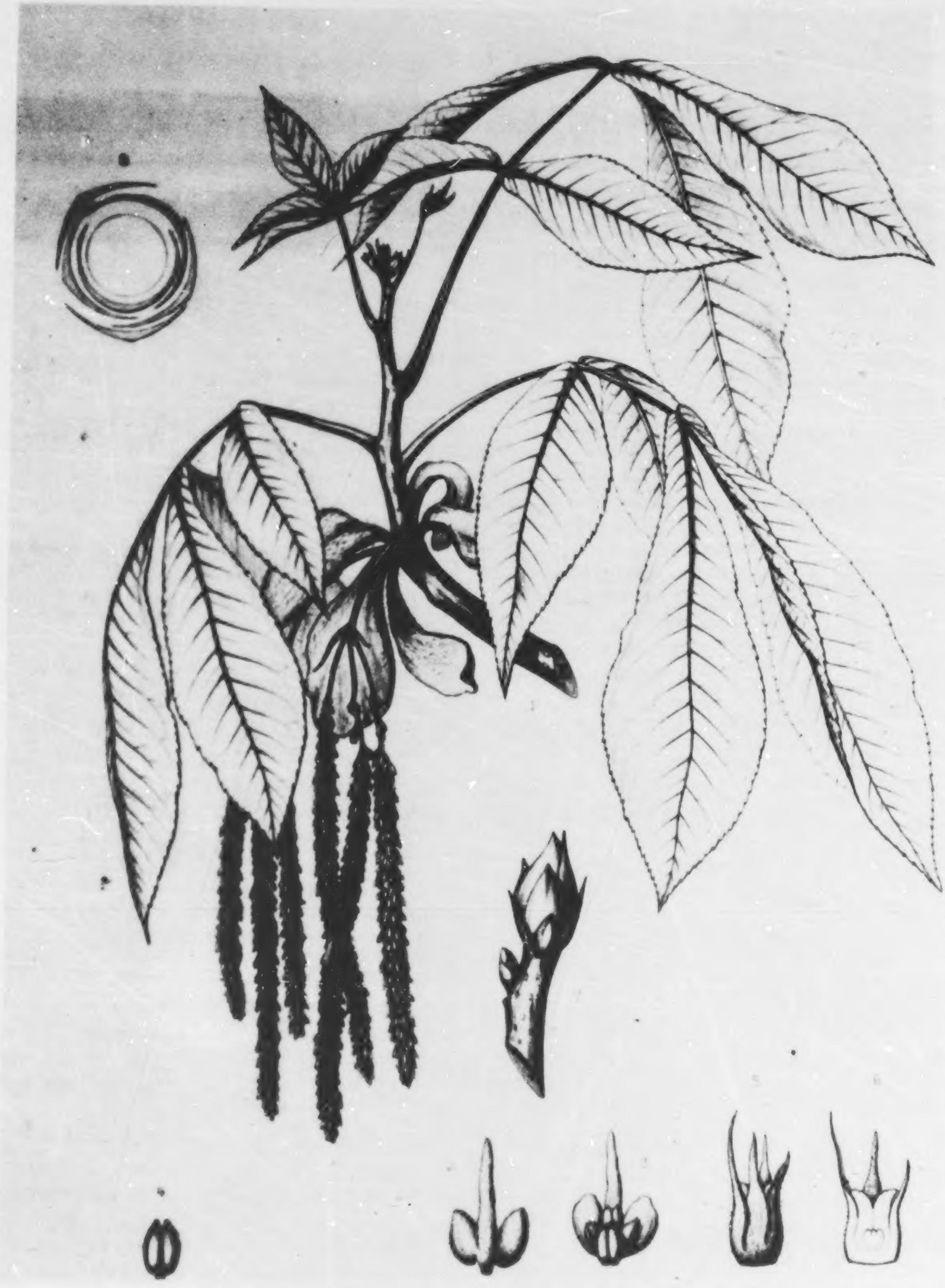
Distr in the Torrey Range. Throughout the range except in the pine barrens of NJ and e and s of them and on the coastal plain of LI; apparently always increasing northw.

Time of Fl. May, fr Sep-Nov; fl May 15-Jun 10 at Cornell.

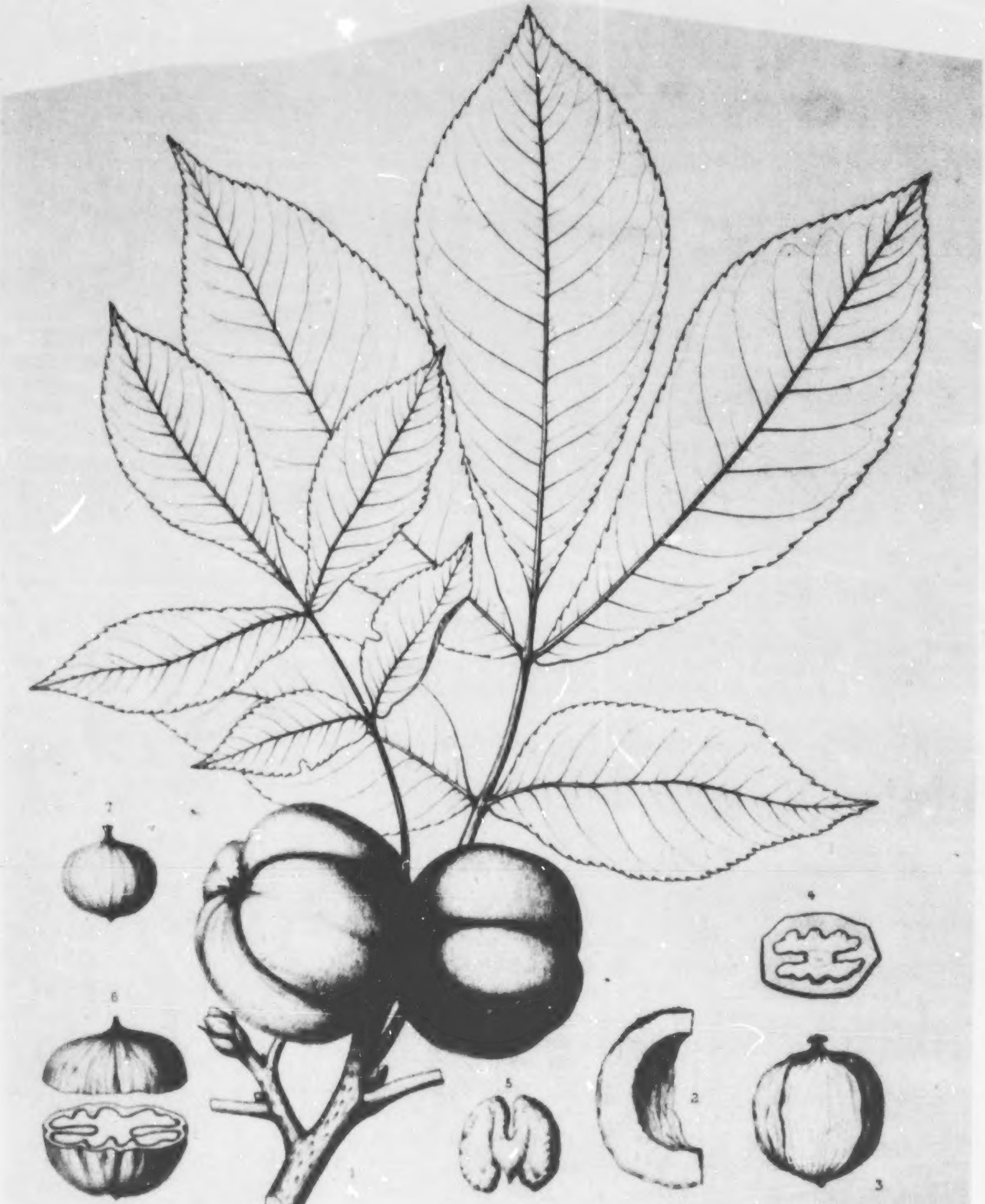
Origin. Native.

Remarks. Wood strong, tough, light brown; wt 52 lb per cu ft. Bark light gray, soon separating into long plates.

This is one of the best-known of all our native trees. Wherever it grows, it is readily recognized by its gray bark, which breaks into long, thin plates that curve away from the trunk, giving it a singular appearance for which "shagbark" is certainly an appropriate name. Of its 5-7 hairless



Carya ovata--Shagbark Hickory (flowers)
[From Sargent (1891-1902), Vol. VII, Plate 346, p. 153.]



Carya ovata--Shagbark Hickory (fruit)
[From Sargent (1891-1902), Vol. VII, Plate 347, p. 153.]

leaflets, the end one is the largest, but its stout twigs and gray bark exfoliating in long narrow shaggy plates will usually separate the mature Shagbark Hickory from all other trees in the Catskills.

To watch the young leaves and flowers emerge in early spring is a memorable sight, well described by Peattie (1950): "About the first week in April the inner bud scales begin to open, arching out and twisting at the same time but with their tips at first still adhering in a pointed arch. Shining and downy on the inner surface, and yellow-green richly tinged with red, they look like petals of some great tulip or magnolia as finally they part and curl back. The young leaves and catkins are then seen standing up in a twist, like a skein of green wool." Then in autumn, if the leaves last through the season, they gleam with a soft dull glow in the pale sunlight.

After the first heavy frost in autumn the thick husk surrounding the nut splits into four sections, which tumble to the ground, along with the nut they contained. Gray squirrels, however, usually do not wait for the nuts to ripen but often begin cutting them from the trees in late summer. Hickory nuts are one of their favorite foods and in fall they work overtime gathering and hiding them beneath the carpet of fallen leaves on the forest floor. Many of these nuts are never retrieved, so they sprout and grow into trees. Fox and flying squirrels are also particularly fond of hickory nuts.

The wood of the Shagbark Hickory is known for its great strength and toughness and is superior to that of most other hickories except perhaps that of the Pignut Hickory. Its wood is very heavy, hard, tough, strong, close-grained, and elastic, well known for its ability to withstand sudden shocks. It is--and always has been--the preferred wood for the handles of certain tools (especially axes and pitchforks), and large quantities of hickory were formerly used to make spokes and rims for wagon and buggy wheels, buggy shafts, and singletrees. Among its other uses are agricultural implements, ladder rungs, baskets, archers' bows, gymnasium apparatus, and furniture. Pioneers made boxes of the shaggy bark, and green hickory splits made perfect hinges for their cabin doors, while hickory hoops held their barrels and casks together. Millspaugh (1887) sheds additional light on early uses made of this species: "The bark of this hickory affords with copperas an olive, and with alum a green dye for woolens. The ash yields a very fine lye, and the meats an excellent oil for burning. The wood is valuable for handles of implements, for barrel hoops, sailing-rings, hand-spikes, and pins, but is useless for any purpose in which it would be subjected to alternate wettings and dryings." A tincture of the ripe meats of the nuts was used medicinally, but Millspaugh stated that in his experience it had "little use in medicine." Steyermark (1963) notes that this species also is "one of the principal species of Carya, other than C. illinoensis, whose pollen is known to be responsible for causing hay fever." For smoking meats green hickory is the best wood obtainable; hickory-smoked hams and bacon have had a high reputation since early colonial days. Hickory also stands high among North American firewoods; its fuel value is higher than that of any other native tree except the locust, and a cord of hickory is nearly equal to a ton of anthracite in thermal units. Not only does it have a high heat value, but it leaves an excellent bed of coals for baking or barbecuing various meats. Few trees in the northeastern forest grow more slowly, however, and it was already getting scarce in many areas at the beginning of the present century.

The kernels within the nut are sweet and deliciously flavored. The Indians prized hickory nuts very highly, as William Bartram reveals in his *Travels*: "The Creeks store up the last [Shagbark Hickory nuts] in their towns. I have seen above an hundred bushels of these nuts belonging to one family. They pound them to pieces, and then cast them into boiling water, which, after passing through fine strainers, preserves the most oily part of the liquid; this they call by a name which signifies hiccory milk; it is as sweet and rich as fresh cream, and is an ingredient in most of their cookery, especially homony and corn cakes." In one Indian language this milky liquor was called "powocohicora," from which our word "hickory" is presumably derived. The Indians also used the sap of hickories in making syrup and sugar. During the first quarter of the 20th century, hickory nuts were an important article in U.S. markets, even being exported to Great Britain, but it is now cultivated only to a limited extent.

The most obvious way to use hickory nuts is merely to crack them with a hammer and eat them raw; few nuts are better for this purpose, but they also have a singular place in cooking, especially in candy, cake, and cookie recipes. Gibbons (1962) experimented with the pounded, unshelled nuts as used by the Indians and from them made a pudding. After first cracking the nuts to make sure there were no rotten or wormy ones, he pounded them up until the meats were quite well loosened from the shells. In a kettle he poured boiling water over 1 quart of these pounded nuts until it stood an inch above them, then boiled the mixture for 15 minutes, during which time the shells sank to the bottom, being heavier than the nut meats. Using a large cooking spoon, he next carefully skimmed off the liquid with its floating nut meats, then strained the rest of the liquid from the shells through a double thickness of cheesecloth. When this liquid nut-meat mixture was poured back into the kettle, the powdered shell which had passed through the cheesecloth settled to the bottom and it was easy to drain the liquid off without including any shell material, ending up with 3 cups of liquid-nut mixture. To make the hickory-nut pudding, he mixed 6 tablespoons of cornstarch and 1/2 cup of sugar with enough of the liquid nut-meat mixture to make a thin paste. After bringing the mixture in the kettle to a boil, he slowly poured in the sugar-cornstarch mixture and kept stirring until the pudding became quite thick. A little vanilla was added at the last minute, and the mixture was poured into a mold. After it has set, it can be turned out on a plate to make a delicious dessert.

Juglans L. Butternut, Walnut.

This genus is known throughout the world both for its highly valued timber and fine-flavored nuts. There are about 17 species, but some can be identified only by their fruits. In addition, hard to classify intermediates are sometimes found. Walnuts, occurring chiefly in the north temperate zone in North America and eastern Asia, may live for several centuries, growing from 100 to 150 feet tall with trunk diameters of 4 to 6 feet. It is said that in the golden age of Greece, men lived upon acorns while the gods enjoyed walnuts; the scientific name of the genus, a contraction of the Latin *Jovis glans*, the nut of Jupiter or Jupiter's acorn, is therefore a reflection of this bit of ancient lore.

These trees have alternate, pinnately compound leaves with from 9 to 23 oblong, lance-shaped, strongly aromatic leaflets, stout twigs with pith occurring in overlapping flakes (easily seen by splitting a twig lengthwise), and large, more or less 3-lobed, elevated leaf scars. The male and female flowers occur in separate catkins on the same tree, the thick, heavy male catkins drooping from the branches. The small pistillate flowers in the axils of developing leaves are inconspicuous and require close scrutiny to locate. The fruit consists of a leathery, nonsplitting husk enclosing a hard-shelled nut that is wrinkled or deeply sculptured on the outside.

Walnuts have long been highly regarded for their delicious nuts. The so-called English Walnut sold in grocery stores is the fruit of an old-world species, _J. regia_, which is probably indigenous to the mountains of Greece, in Armenia, in the region south of the Caucasus and the Caspian Sea, on the Himalayas, and in Burma. The nut of the wild tree is small with a thick hard shell and a small kernel that is scarcely edible, but centuries of cultivation and careful selection have produced a number of forms which are propagated by grafting or budding. It was cultivated in northern India in very early times and carried thence to China, where it is still grown on a large scale. The Greeks cultivated a variety of this tree obtained from Persia; the Romans carried it to Italy, whence its cultivation has spread through all the countries of southern and western Europe as well as to the Pacific states of North America, Chile, and other temperate regions. The fruit of this tree is of greater importance as a food crop than that of any other nut-producing tree outside the tropics. In the United States alone annual production of English walnuts during the five-year period 1948-52 averaged 76,320 tons.

It and the eastern Black Walnut also furnish two of our most valuable woods, for they are tough, strong, moderately hard, very durable, do not warp or split easily, and can be made to receive a beautiful polish. Before the introduction of Mahogany into Europe, _J. regia_ was much employed in the making of furniture and interior finish, and the wood of no other tree is considered so valuable for gunstocks and is much used in Europe for this purpose. In Cashmere it is employed in turnery and is sometimes lacquered. In addition, the bark, leaves, and hulls of some species contain tan, beige, brown, or black dye substances used in coloring cloth and staining wood.

According to Pliny (23-79 A.D.), this species was introduced into Italy from Persia, which may well be correct, but it was also earlier mentioned as existing in Italy by Varro, who was born in 116 B.C. Not only does the nut form an important article of food, but in some parts of France and northern India considerable quantities of oil are expressed from the kernels to be used in cooking as a substitute for olive and almond oils, for illuminating, and as a drying oil in the arts. The nut cake left after the oil is expressed is nutritious and is used to fatten poultry and other domestic animals. In Circassia, sugar is said to be made from the sap; fermented, the sap makes an intoxicating liquor called walnut wine. Both the bark and the husk of the fruit, which contain tannic acid, have been used in tanning leather.

Several products of this walnut were once much valued medicinally in Europe and Asia. The hull of the fruit has been employed as a vermifuge from the time of Hippocrates. The expressed oil of the fruit has likewise been deemed efficacious against tapeworm and was also used as a laxative injection.

In France a bitter and astringent infusion of the leaves was considered effective in the treatment of scrofula. It appears also to act as a moderately aromatic bitter and astringent. Preparations for relieving itch and for treating eczema have likewise been prepared from various species of walnuts, and from the bitter outer coat of the seed a type of tannic acid has been obtained for medicinal use. In India the bark is used as a dye, in native medicine, and as a dentifrice; and the leaves and young branches serve as fodder for domestic animals.

The young fruits of both our native species are sometimes pickled. This practice dates back to colonial days and was probably brought from England or France, where pickled walnuts are still popular. The half-grown fruits, including the husks, were plunged into boiling salted water, afterward thoroughly wiped clean of the down, then preserved in boiling vinegar spiced to taste. In some areas only the green nutmeats were pickled.

Key to Local Species of Juglans

1. Leaves downy with fascicled hairs, especially beneath; terminal leaflet usually present; fruit oblong, the husk sticky; petioles and young twigs sticky with clammy hairs; leaf scars on branchlets with a hairy fringe along upper margin; pith dark brown; bark of trunk gray, with broad ridges............................ J. cinerea

1. Leaves smooth and glossy above, the lower surface and petioles minutely downy, the hairs solitary or in pairs; terminal leaflets absent on most leaves; fruit globose, not sticky; leaf scars on branchlets notched, without a hairy fringe along the upper margin; pith light brown; bark light brown and rough.............. J. nigra

Juglans cinerea L. Butternut.

Meaning of Species Name. Ashy, probably from the color of the grayish bark.

Other Names. White Walnut, Lemon Walnut, Oilnut.

Type of Plant. A forest tree rarely over 100 ft high, more commonly 30-60 ft tall with a trunk 1-3 ft in diameter.

Habitat. Rich or rocky woods, along river terraces, roadsides, and hillsides.

Range. NB to Ont, n Mich, and ND, s to Va, Ga, Kan, and Ark, becoming rare over much of its range.

Distr in NYS. Frequent or common across the state.

Distr in the Torrey Range. NY: Occasional on LI and SI, increasing and common northw.

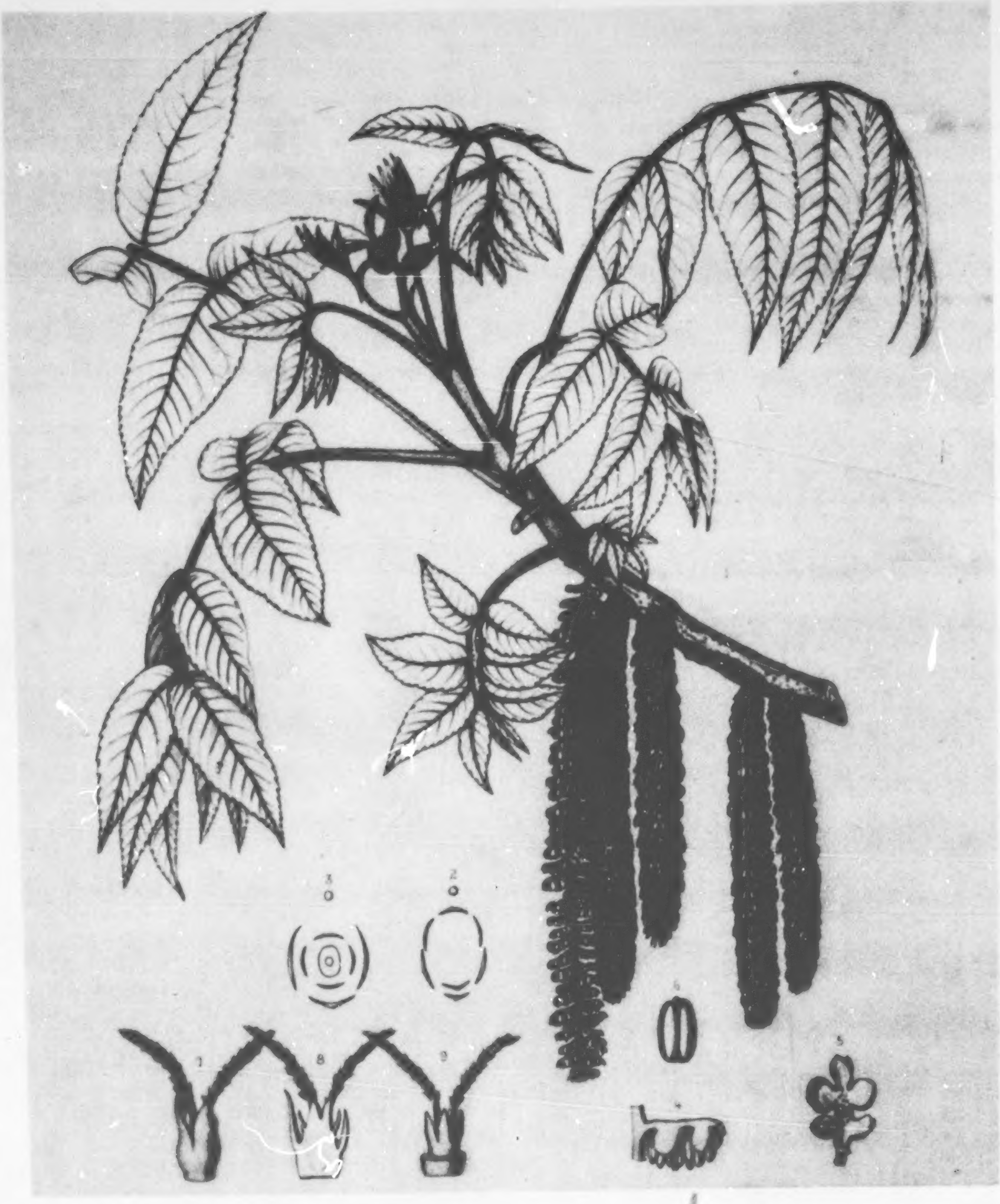
Elevation. Sea level-1800 ft in the Torrey range; in the Adirondacks it grows only along streams below 1500 ft; grows to 2500 ft in Va.

Time of Fl. Apr-May, fr Oct-Nov; fl May 15-30 at Cornell.

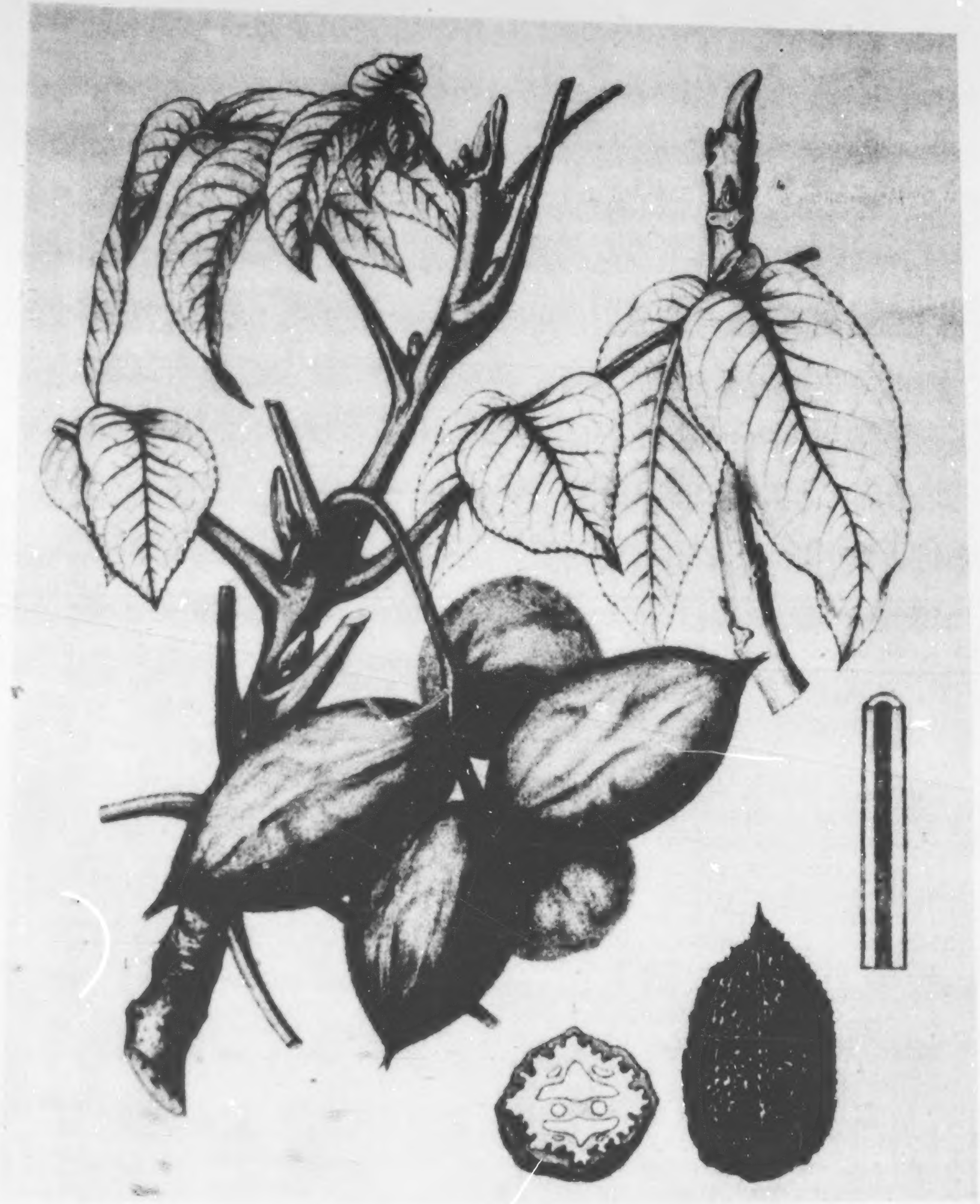
Origin. Native

Remarks. Wood soft, rather weak, light brown; wt 25 lb per cu ft.

The Butternut tolerates cooler climates than does the Black Walnut, so it ranges much farther north and occurs at much higher elevations than the latter species.



Juglans cinerea--Butternut (flowers)
[From Sargent (1891-1902), Vol. VII, Plate 331, p. 118.]



Juglans cinerea--Butternut (fruit)
[From Sargent (1891-1902), Vol. VII, Plate 332, p. 118.]

The early settlers made much use of this species, as did the Indians before them. In spring the Indians collected the richly sweet sap, from which they made a sugar considered by some nearly if not quite equal to that of the maple, though its yield is but a quarter as much. They likewise dried the nutmeats for use in cooking, used the crushed green fruits to poison fish, and pressed a highly prized oil from the nuts (or extracted it by boiling), for Roger Williams reported of the local Indians that "of these Wallnuts they made an excellent oyle good for many uses, but especially for their annoynting of their heads" (Black Walnut and some of the hickories were probably also so used) and for use as butter and for flavoring. He also reported that "of the chips of the Walnut-tree, the barke taken off, some English in the country make an excellent Beere both for taste, strength, and color."

The brownish wood of the Butternut is light, soft, weak, and close-grained, but it is less durable than that of the Black Walnut. It is easily worked, however, and when polished it shows a beautiful grain and has a satiny luster, making it ideal as a cabinet wood and for interior finish, never warping or cracking. Emerson (1878) presents a picture both of the versatility of its wood and of the people who used it. Besides being used for gunstocks, for which it was nearly equal to Black Walnut, although less hard, "It makes beautiful fronts of drawers, as used by the Shakers at Lebanon, and excellent light, tough, and durable wooden bowls." In the western part of Massachusetts, coffins were often made of it. "Where abundant, it was used for posts and rails, and for the smaller timbers in house frames. It is sometimes used for the panels of coaches and other carriages, being pliable, not splitting when nails are driven into it, and, from its porosity, receiving paint extremely well." It was also a favorite of the wood carver; many beautiful altars in older American churches were made from this wood.

The tree is occasionally grown as a shade tree and for its nuts, as they are highly esteemed for their sweet, oily, rich-tasting kernels. They are often gathered for home use but one seldom sees them on the market; walnuts and pecans have captured the popular fancy. The unique flavor of the Butternut, however, makes it ideal for use in candy, cookies, and cakes, and many housewives prefer them to any other nut for use in cooking. Because it is low and rather wayward in growth, late to leaf out in spring and early to shed its leaves in summer, however, the Butternut is not a good street tree. In addition, it breaks easily in the wind, insect and fungus enemies beset the tree, and numerous dead branches frequently detract from its appearance. The nuts are eaten by many wild animals, especially squirrels of all kinds. Actually, squirrels are probably the chief agency for seed dissemination.

The Butternut contains a water-soluble dye widely used by the pioneers for dyeing cloth, but it is inferior to that of the Black Walnut for this purpose. Americans early knew the art of extracting rich and durable browns and tans from the roots, leaves, hulls, and inner bark of this species, for in 1669 Governor Winthrop sent a report with samples of Butternut dyeing to the Royal Society of London. Besides producing browns, Butternut bark was often used in the preparation of a black dye; when put in an iron kettle, if allowed to remain long enough, the bark will dissolve enough of the iron to make a tolerable black. Even as late as the Civil War, some backwoods regiments went into battle wearing uniforms of homespun cloth colored with

Butternut dye, thus earning the name "Butternuts." Emerson (1878) states that the Shakers of Lebanon also obtained a rich purple dye from this tree, while Steyermark (1963) notes that the early settlers prepared orange and yellow dyes from the bark and green fruit. Usually the husks were used, the mature nuts being gathered when still green and allowed to ripen partially. The hulls were then ready for use but they could be dried and stored for future use. A more permanent brown was obtained by using an alum mordant.

For those interested in preparing native dyes for home dying, Adrosko (1968) is an indispensable reference, giving basic suggestions concerning the use of mordants, preparation of dye materials, and general instructions, together with numerous detailed dye recipes. To dye 1 pound of wool, cover 1 peck of green Butternut hulls with water and soak for 30 minutes before bringing them to a boil and simmering for 15 to 30 minutes. When cool enough to handle, strain the liquid and add enough cold water to make a dyebath of 4 to 4 1/2 gallons. Thoroughly rinse the mordanted wool and squeeze out excess moisture before immersing it into the dyebath, then heat to boiling, boil for 30 minutes, then rinse and dry.

Another rather unusual use was made of the green fruits of the Butternut, for they were employed to make a highly esteemed pickle. The early settlers plunged the half-grown fruits into boiling water, wiped off the sticky down, and pickled them whole in spiced vinegar. Pickling green Butternuts in their husks may still be on the summer program of many housewives if the woods near by furnish the raw material for using her great-grandmother's recipe. In her book on trees, Rogers (1926) writes: "If a knitting needle goes through the husk and nut without hindrance, it is not too late to make 'pickled oil-nuts,' which are a delectable relish with meats in winter. The unpleasant part of this process is ... rubbing off the 'fur' after scalding the nuts. This task usually falls to the children."

The inner bark of the roots, collected in May or June, has often been used as a mild cathartic, which the pioneers made by boiling 1 pound of the bark in 1 gallon of water reduced to a quart and adding honey. The colonists no doubt learned of its medicinal values from the Indians, for several tribes are reported to have used it for stomach upsets, digestive disorders, and as a mild laxative, as well as for rheumatism, headache, and toothache. They also made a strong decoction of it to apply warm on fresh wounds, as it was "an excellent styptic." Other tribes used sugar and syrup from this tree as "a standard Indian physic"; Butternut molasses was used for the same purpose by native whites in West Virginia as late as the early 1900's. The Meskwakis boiled the twig bark for a cathartic while the Potawatomis drank an infusion of the inner bark as a tonic. The powdered leaves also act as a rubefacient and vesicant (that is, they produce redness and blistering of the skin) and have been used as a counterirritant, and an oil expressed from the nuts was administered to get rid of tapeworm. In addition, the root bark has been employed as a liver stimulant.

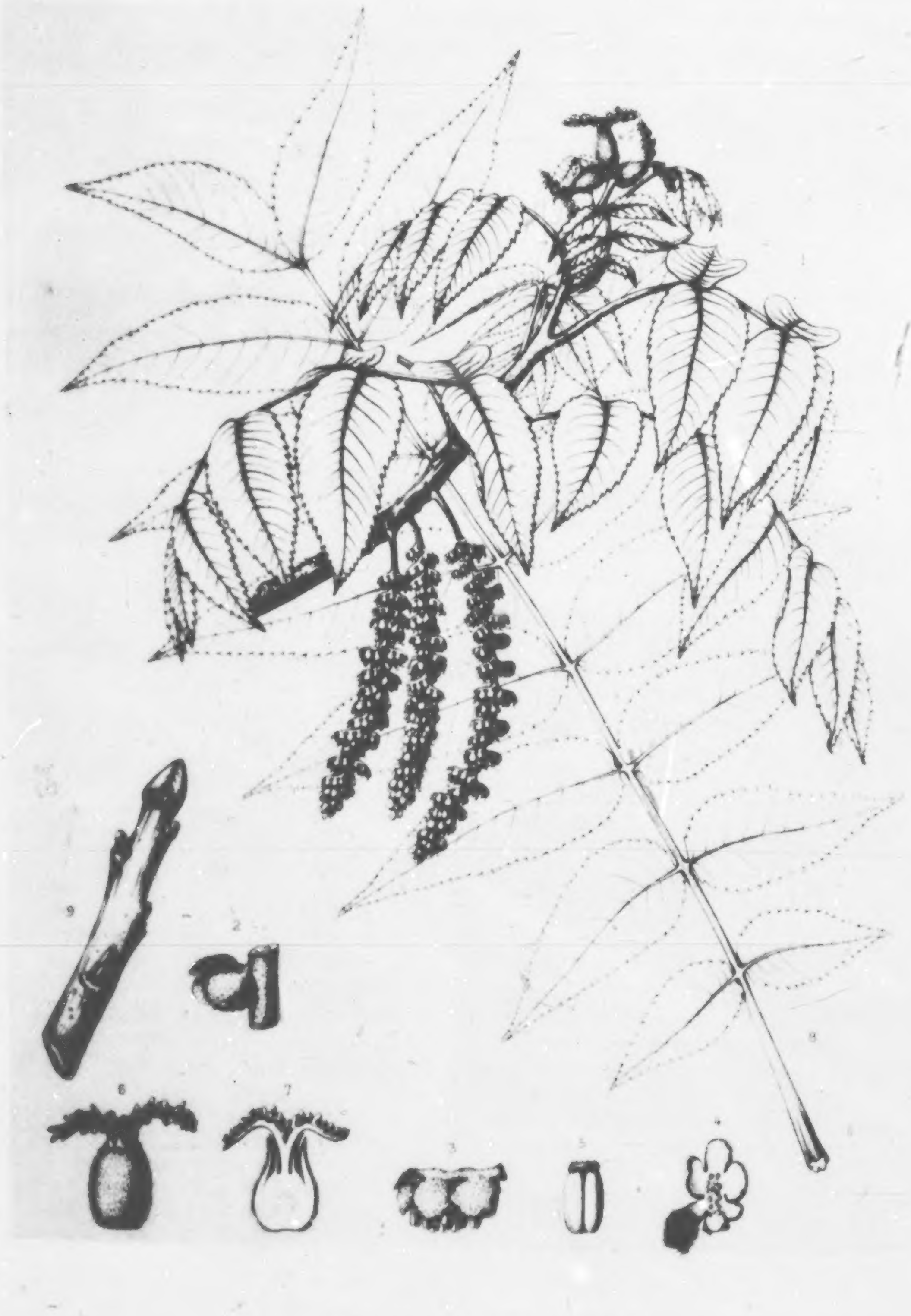
"Butternut," states the U.S. Dispensatory of 1865, "is a mild cathartic, operating without pain or irritation, and resembling rhubarb in the property of evacuating without debilitating the alimentary canal. It was much employed during our revolutionary war, by Dr. Rush and other physicians attached to the army. It was especially applicable to cases of dysentery, in which it has acquired considerable reputation." Of it Lighthall (n.d.), a noted Indian medicine man, states that "It is a fine laxative and cathartic, and constipation seldom, if ever, follows its cathartic effects." His pragmatic method of preparing a tincture from the bark was simplicity itself, for he took the inner bark of the Butternut tree, cut it into fine pieces, and filled a quart bottle full of the pieces, then added equal parts of water and 98 percent alcohol. After standing for 14 days, it was ready for use. The dose of the tincture was 3 or 4 tablespoonfuls a day. The inner bark was official in the *U.S. Pharmacopeia*, 1820-1905, and in the *National Formulary*, 1916-36, but it is still in demand by manufacturers of pharmaceutical products.

Juglans nigra L. Black Walnut.

Meaning of Species Name. Black, from the dark wood.
Type of Plant. A large tree, sometimes reaching a height of 100 ft with a trunk 7-8 ft in diameter, but usually only 50-75 ft high with a trunk 3-4 ft in diameter.
Habitat. Rich moist or rocky woods and along streams.
Range. NE to Mich, Minn, and Neb, s to Fla and Tex.
Distr in NYS. Frequent or common across the state northw to Rensselaer, Washington, and Saratoga co, the Mohawk valley, Lewis and Jefferson co, and westw to L Erie; rare in Chemung and Tioga co.
Distr in the Torrey Range. Throughout.
Elevation. Sea level-1800 ft in the Torrey range.
Time of Fl. Apr-May, fr Oct-Nov; fl May 15-30 at Cornell.
Origin. Native.
Remarks. Wood strong, hard, rich brown; wt 38 lb per cu ft; much less common as a forest tree than formerly.

The Black Walnut is the largest of the genus and the second species of *Juglans* to be found native east of the Rocky Mountains. The English name "walnut" is partly of Teutonic origin, the Germans naming the nut *Wallnuss* or *Welsche Nuss*--*Welsche* signifying foreign. This stately tree, which is more common west of the Appalachians than east of them, does best in the rich moist soil of hillsides and loamy bottomlands and is often encountered along fences, roadsides, and the borders of woods. It was originally a forest tree but is now rarely seen in the dense woods. It attains its maximum growth on deep rich soils, sometimes reaching a height of 100 feet in the Mississippi basin.

The Black Walnut grows best when it can stand well by itself in an open field or a dooryard. Its limbs then spread widely and the head becomes a great green dome. The bark is dark brown with prominent ridges and deep furrows. Both the large compound leaves and the staminate catkins, which appear with the leaves, much resemble those of the Butternut. The fruit is nearly round, enclosed in a yellowish green husk that is roughly dotted, 1 1/2 to nearly 3 inches in diameter. The nut within is dark, rough, and very hard. The sweet, edible, four-celled kernel has a pleasant but strong taste and is quite oily. Dark as is its wood and bark, no walnut tree in full leaf is somber. The graceful aromatic foliage is a bright, lustrous yellow-green. A majestic tree, with a luxuriant crown from May until September, this tree needs room to display its notable contour and size. It deserves more popularity than it enjoys as a tree for parks, for no tree is more interesting to watch as it grows. In the words of Peattie (1950), "At



Juglans nigra--Black Walnut
[From Sargent (1891-1902), Vol. VII, Plate 333, p. 124.]

all times its appearance suggests massive strength, the trunk solid and heavily furrowed, the compound leaves like big fronds, the catkins heavy and vivid, and the clusters of fruits in fall hard and solid on the tree."

The Black Walnut is one of our most valuable and highly prized timber trees. The value of its lumber together with its beauty and nobility as an ornamental so impressed the American colonists that they were exporting it to England from Virginia as early as 1610. It was still being exported in the early 1800's, for Michaux (1851), writing of the period around 1810, remarked that "The Black Walnut is exported in small quantities to England in planks of 2 inches in thickness: which are sold at Philadelphia at four cents a foot." Its abundance, the ease with which it could be worked with carpenter's tools, its freedom from warping and checking, together with its lasting qualities when exposed to weather or in contact with the soil, led to its use in countless ways. Farm residences, barns, bridges, rail fences, cradles, wheels, bodies of coaches, canoes, boats, and even ships were sometimes made of this wood. At one time it also supplied much wood for railroad ties and rafters, but it is unfit for beams because of its brittleness. The brown wood has purplish tones in it, and it acquires a silvery luster when polished. Because of the beauty of its grain, it has been the queen of American cabinet woods since early colonial days.

Emerson (1887), speaking of the last quarter of the nineteenth century, states that "The wood of the black walnut is of a dark violet, or purple color, becoming deeper and almost black with age. It is valuable for its fineness of grain, tenacity, hardness, strength, and durability.... The wood is beautifully shaded, and admits of a fine polish, and is now very extensively used in the manufacture of tables, chairs, bureaus, bedsteads, and other cabinet work; and sometimes for book-shelves, and the cornices and panels of rooms. Where abundant, it serves the same useful ends that hickory does with us [in Massachusetts]. Posts made of it last for more than a quarter of a century.... More nearly than any other American tree, it resembles the European walnut, which, before the introduction of mahogany, was considered the most beautiful material known for the best kinds of furniture."

From early times, also, it has been the preferred wood for making gunstocks in the United States, by reason of the fact that, as Peattie remarks, "No other wood has less jar or recoil; it never warps or shrinks; it is light in proportion to its strength, it never splinters, and, no matter how long it is carried in the hand, its satiny surface will not irritate the palm." Sargent (1891-1902) remarks that "The sudden demand for gunstocks during the War of Secession greatly stimulated the demand, which has always been large for this wood for domestic use and for exportation; and during the last twenty years [he writes of the period between 1880 and 1900] the agents of lumber-dealers, penetrating into the most remote and inaccessible parts of the country, have bought up often singly and at merely nominal prices every Black Walnut tree of marketable size." During World War I this wood also served a vital end as material for making propellers for military planes, first in England and later in the United States, but the extent to which it was used in making gunstocks during World War II resulted in the greatest drain on the supply that this country has ever experienced. Available supplies of walnut therefore became practically negligible. This scarcity induced the American Walnut Manufacturers Association of Chicago late in 1943 to launch a national campaign to stimulate walnut tree planting throughout the country.

Today much of the available supply of walnut is made into veneer, which is used extensively by furniture manufacturers. The first veneers were sawed 1/8 inch thick, but it is now possible to rotate the log against a knife and unroll, almost like a continuous band of paper, a sheet of wood only 1/28 inch thick. Peattie (1950) states that "An old tree may thus yield up to 90,000 square feet of precious veneer, valued sometimes at $20,000 wholesale." This method also permits the matching of mirror-image cuts of the same grain, resulting in beautiful patterns "that no art of man can touch for delicate intricacy and subtle shading." In furniture and interior woodwork, curly walnut, found in the old stumps of trees cut long before, is especially sought for veneering panels. Even old furniture of designs no longer popular is often sold to the factories and their seasoned wood cut thin for veneering. Steyermark (1963) notes that "Missouri, Illinois, Indiana, and Ohio continue to furnish the bulk of the commercial supply of this species."

The sap of this species, tapped in spring, was boiled by the Indians of the eastern United States to produce a sweet syrup. In addition to using the plain nuts in a fresh or dried state, they also prepared them in several ways for use in soups and gravies as well as extracting an oil that was used like butter. Medsger (1927) states that "The black walnut is one of our most important native nut-bearing trees," second only to the pecan, having a sweet, somewhat oily kernel of a distinctive quality and flavor, but Sargent remarks that "The nuts, which were valued by the Indians of the Mississippi Basin, are still gathered for domestic use, and are sometimes offered for sale in the markets of western and southern cities, although the kernel, which is sweet and has a pleasant flavor while fresh, soon becomes rancid ..." Emerson was more lauditory: "Its rich, oily fruit, *when carefully dried* [italics not in original], is nearly equal to that of the shagbark hickory. From the kernel a valuable and abundant oil may be expressed, superior to most others for use in cookery, and for lamps. Bread has also been made from the kernels." Grieve (1967) remarks that in some parts of France the oil has been used for frying, eaten as butter, and employed as a lamp oil. About 15 pounds of nut-meats can be extracted from 1 bushel of nuts, yielding about 7 pounds of oil. This oil is also used to polish wood, and, because it does not congeal with cold, is useful to painters "for mixing gold size and varnish with white and delicate colors."

In Michaux's time these nuts were "sold in the markets of New York, Philadelphia, and Baltimore, and served upon the tables." They are not now so widely available, in part because they must be harvested at just the right time and under just the right conditions. At home boys spread them out on the roof of the woodshed, for instance, so the husks can dry while the nuts are seasoning. No walnut opens its husk in regular segments, as all the hickories do, but the husking is not hard. The thick shells, on the other hand, require careful management of the hammer or nutcracker to avoid breaking the meats. The walnut is a valuable confection in the market, and a favorite flavoring for making cake, ice cream, and candies. The kernels not only add body to such food products but retain their flavor during the cooking process to a remarkable degree. Numerous varieties are currently available that have thinner shells and more meat than their wild cousins.

For those who may wish to experiment with using Black Walnuts for cooking (assuming that they are available--but Butternuts are equally good), unsurpassed cookies can be made by creaming together 1 cup of butter and 1 1/2 cups of sugar, to which 3 unbeaten eggs are added and mixed well. Next sift together 3 cups of flour, 1/2 teaspoon of soda, 1 teaspoon of cream of tartar, and 1/2 teaspoon of salt. Add the sifted ingredients to the creamed mixture alternately with 1 cup of milk, then mix in 1 cup of Black Walnut meats. This dough is then rolled out to 1/4 inch thickness and cut into small squares. Bake at 450° F until slightly brown, then reduce the temperature to 350° and finish baking.

In an earlier day green walnuts in their husks were not only pickled in spiced vinegar in the manner described above for the Butternut, but they were also preserved in syrup, the idea for both practices having been brought by the colonists from England. An early English recipe for preserving green walnuts in syrup reads as follows: "Take as many green Walnuts as you please, about the middle of July, try them all with a pin, if it goes easily through them they are fit for your purpose; lay them in Water for nine days, washing and shifting them Morning and Night; then boil them in water until they be a little Soft, lay them to drain; then pierce them through with a Wooden Sciver, and in the hole put a Clove, and in some a bit of Cinnamon, and in some the rind of a Citron Candi'd: then take the weight of your Nuts in Sugar, or a little more; make it into a syrup, in which boil your Nuts (scimming them) till they be tender; then put them up in Gally Potts, and cover them close. When you lay them to drain, wipe them with a Course cloth to take off a thin green Skin. They are Cordial and Stomachal."

Black Walnut hulls (as well as those of the Butternut) furnished one of the earliest home dyes in America. Collected while the hulls were still green, the nuts were pounded with a hammer against a flat stone to remove the husks. They could then either be dried and stored for future use or covered with water and kept in a dark place for a few days (this procedure seemed to produce darker colors); many dyers believed, however, that the dye prepared from dried hulls was more potent than that from fresh ones. The inner bark of the roots was also sometimes used, even though it was less potent than the hulls. As early as the mid-1700's Peter Kalm observed that the women of New Jersey and Pennsylvania were using both Black Walnut bark and nut husks to dye wool a lasting brown. It was also used to furnish a black dye after first giving the wool a "blue ground" by dyeing it with indigo. A "tolerable black" could also be achieved without giving the wool a blue ground if the walnut or butternut bark was put in an iron kettle and allowed to remain long enough to dissolve some of the iron, but this process was considered fit "only for stuffs of inferior quality," although many women of 1810 used it thus for coloring stockings. No mordants were needed for either walnut or butternut dyeing; the dye material was simply boiled for a certain period and the wetted cloth dipped or boiled until the desired color had been achieved. It was felt, however, that the use of mordants not only produced richer colors but that they varied the tone as well. Alum-mordanted yarns became a dark rosy brown while chrome-mordanted wool became a darker black-brown. Unmordanted yarns had a tendency to become gray-brown, and adding a pinch of copperas "after dyeing has taken place" gave the brown a greenish cast. Iron kettles were used in all cases. Another authority, however, states that khaki can be obtained with a chrome mordant and that both a yellow-brown and a dark brown can be achieved by using an alum mordant. Obviously, some experimentation will be necessary if one wishes to make use of these native dye materials. A beautiful stain for leather or wood can also be made.

To dye 1 pound of wool a dark brown, 3/4 peck of green hulls from the Black Walnut were covered with water and soaked for 30 minutes before bringing them to a boil and simmering for 15 minutes. The hulls were then strained out and enough cold water was added to make a dyebath of 4 to 4 1/2 gallons. The wool was then thoroughly wetted and the excess moisture squeezed out before immersing it in the dyebath, which was heated to boiling, simmered for 20 minutes, then rinsed and dried. Using alum-mordanted wool would brighten the color but reduce its lightfastness, and overboiling would make the texture of the wool harsh. Another recipe suggests soaking 6 quarts of green hulls overnight then boiling for 2 hours before straining out the liquid, after which the wetted wool was simmered for 1 hour. It was stated that adding a few "sumac berries" and a pinch of copperas (ferrous sulfate) would darken the color. This dyebath could be used several times, each time resulting in a lighter color.

To obtain a black color, the wool was first dyed with indigo to get a deep blue. A handful of "sumac berries" was then added to the dyebath, prepared as for dark brown, and the wetted wool was simmered for 1 hour and left overnight in the dyebath. If the resulting color was not dark enough, more Black Walnut dye and a pinch of copperas were added, the dyebath was again heated to the boiling point and simmered until the color was right, after which the wool was thoroughly rinsed and dried in the shade. It was also possible to obtain a black dye from the leaves alone. They were gathered during the fall as they fell from the tree. A layer of leaves was alternated with a layer of wool in a large kettle until it was nearly full, the whole was then covered with water and boiled for 12 hours. This mixture was left to cool overnight, after which the juice was poured off, a fresh series of leaves and the partly dyed wool was prepared, the old juice was poured back, and the boiling process was repeated. This dyed yarn, "after hanging for a few days and washing, will be a pleasing black."

Since the European or English Walnut, J. regia, had for centuries been the source of several medicinal preparations in Europe, the settlers of this country, not without reason, early made much use of our native Black Walnut in medicine. They collected the bark in spring or fall, the fruit in late summer or early fall, and the leaves as required. The bark and leaves were considered alterative, laxative, astringent, and detergent. The leaves were stripped off the tree singly in June or July then dried. Both bark and leaves were thought to be "of the highest value" for curing scrofulous diseases, herpes, and eczema, as well as for healing "indolent ulcers." The bark, dried, powdered, and made into a strong infusion, was considered a useful purgative, while the green husks were used as a vermifuge. The inner bark was commonly used during the American Revolution as a mild laxative. The juice of the green husks was used for treating tapeworm, as a laxative, and as a gargle in the treatment of diphtheria; boiled with honey, it was considered an effective gargle for sore mouth and an inflamed throat. Distilled water from the green husks was used to treat quinsy and as an application for wounds. The thin yellow skin that surrounds the inner nut was a notable remedy for colic, being first dried then reduced to a powder, while the oil extracted from the ripe kernels was taken internally for colic and applied externally "for skin diseases of the leprous type as well as for wounds and gangrenes." This species is still in demand by manufacturers of pharmaceutical products. Steyermark (1963) observes that "Although much pollen is shed by this species, it does not appear to enter into hay fever cases."

One authority states not only that no insect will touch the leaves of the Black Walnut but that the husks and leaves, macerated in warm water, impart to it an intense bitterness that, when poured on lawns and grass walks, will destroy all worms without injuring the grass. A leaf infusion has also been used against bedbugs. The roots of this species are also reported to emit a substance poisonous to such plants as tomatoes. Both these observations warrant further investigation in the search for natural insecticides and weed-killers.

Martin *et al*. (1961) observe that all our native walnuts are doubtless useful to wildlife, but that only the eastern Black Walnut "has recognized importance," as four species of squirrels eat the nuts. Woodpeckers and both the gray and red fox are also reported to make occasional use of them. Squirrels often bury the nuts for possible future use, as the bitter husk deters their gnawing into the nut until the husk is dry and brittle. Many of these nuts are never dug up, so the squirrels play an important service in dispersing these seeds.

FAGALES

This order was considered by Engler to contain two families, the Betulaceae and the Fagaceae. Benson (1979) remarks that "The relationships of this specialized order are obscure, as is its derivation," but a number of American botanists have suggested that these two families may have been derived from stocks ancestral to the Hamamelidales and that they are advanced over that family; in any case, there is abundant evidence to support the view that this order is not one of primitive dicots.

Key to Local Genera of Fagales

1. Buds distinctly stalked; leaves broad (leaves serrate or doubly serrate).. *Alnus*
1. Buds not stalked, 2
    2. Leaves coarsely dentate or serrate, never doubly serrate, 3
        3. Terminal buds clustered; leaves oblong-lanceolate; trunks with rough bark; fruit an acorn............................ *Quercus*
        3. Terminal buds not clustered; fruit a 4-valved prickly bur, 4
            4. Leaves oblong-ovate; buds long and sharp-pointed; terminal bud present; trunk with smooth gray bark............ *Fagus*
            4. Leaves oblong-lanceolate; buds ovate and blunt; terminal bud absent; trunk with rough bark.................... *Castanea*
    2. Leaves unevenly and mostly doubly serrate (sometimes entire near the base), 5
        5. Branches with short spurs bearing 2 leaves; bark on younger trunks smooth or peeling off in rolls; lenticels elongated horizontally; twigs and inner bark often with wintergreen flavor; fruit a samara in conelike catkins................. *Betula*
        5. Branches without short spurs; bark never peeling off in rolls; wintergreen flavor absent, 6
            6. Leaves ovate or ovate-oblong, not taper-pointed, hairy; twigs mostly with bristly hairs; shrubs; fruit a nut within a husklike involucre.................................. *Corylus*

6. Leaves much longer than broad, taper-pointed; leaves and twigs more or less glabrous, 7
    7. Lateral veins unbranched; buds with flattened sides; bark smooth and sinewy-fluted; fruit a nutlet with bractlike appendage, several grouped in a flexuous spike................ Carpinus
    7. Lateral veins branched near margin of leaf; buds terete; bark rough, breaking off in scaly plates; fruit a nutlet enclosed in an inflated bag, several grouped in a conelike spike........ Ostrya

BETULÀCEAE, the Birch Family

This is a family of 6 genera and about 110 species, mostly in the northern hemisphere, of which 5 genera are indigenous to the Catskills. The sixth genus, Ostryopsis, occurs in eastern Asia. Fernald (1950) calls this taxon the Corylaceae, the Hazel Family, a name which antedates Betulaceae, but it has been proposed that the latter name be conserved. There is considerable evidence to support the view that the reproductive structures are not simple but have flowers that are complex by reduction. Economically the family is important for the hardwood lumber obtained from the birches. In addition, oil of betula extracted from the twigs of some birch species has the flavor and odor of wintergreen, edible hazelnuts and filberts are produced from species of Corylus, high-grade charcoal is made from the wood of Alnus, birch beer is made or flavored from the sugary sap of birches, and the very hard wood of Ostrya is prized for mallets and beetles.

Key to Genera of Betulaceae

1. Fruiting spikes conelike; scales of the pistillate catkin enlarging in fruit, each subtending 2-3 flat fruits; involucre none, 2
    2. Pistillate scales thick, becoming hard or woody, long persistent; fruit merely thin-margined or with a coriaceous margin.... Alnus
    2. Pistillate scales thin, deeply 3-lobed, eventually deciduous; fruit (samara) winged.. Betula
1. Fruiting inflorescence various; scales of the pistillate catkins deciduous, the involucre greatly enlarging with age, enclosing or subtending a single nut or nutlet, 3
    3. Fruit a nut 1-1.5 cm long, closely enveloped by the lacerate-margined involucre; leaf blade usually with 5-8 veins on each side of midrib.. Corylus
    3. Fruit a nutlet about 5 mm long, loosely enveloped or merely subtended by the involucre; leaf blade usually with 9-15 veins on each side of midrib, 4
        4. Involucre expanded, 2-3 lobed; bark smooth, blue-gray; lower surface of mature leaves glabrous except for some hairy tufts in the axils of the veins; none of the lower large lateral veins forked.. Carpinus
        4. Involucre a closed ovoid sac; bark scaly, brownish-gray; lower surface of mature leaves mostly hairy; some of the lower large lateral nerves forked.............................. Ostrya

Alnus Ehrh. Alder.

There are about 30 species of alder, chiefly of the north temperate zone. The five or six species of the northeastern states and adjacent Canada are tall shrubs or occasionally small trees of little economic importance. They are distinguished from the birches by their stalked, valvate winter buds and by their cones with thick woody scales that persist on the branchlets long after their small winged fruits have been released. The name of the genus is the ancient Latin name of the alder. The alders of the Rocky Mountain region and the Pacific slope often become large trees. The Red Alder, A. rubra, which attains a height of 120 feet and a diameter of 40 inches, is the most valuable. The wood is soft, works well, and is largely consumed in the manufacture of inexpensive furniture, millwork, and handles, and it is frequently stained to imitate mahogany and walnut. In mountain regions alders are among the first woody plants to appear in areas denuded by avalanches and in the rubble around the edges of receding glaciers.

The bark and cones of the alders contain tannin, and the Eskimos dye reindeer skins with bark extracts. Seton states that an orange dye is thus produced by boiling with the inner bark. The Laplanders also use it to dye their leather garments. According to Kephart, the inner bark is a possible emergency food. The young bark and winter buds are popular nibbles with country boys, not alone for their tolerable flavor, but particularly for the beautiful olive-green saliva produced, which makes very emphatic spots on the lingering snow of early spring.

The Black Alder, A. glutinosa, the most important old world species, is widespread on wet sites in Europe, Asia, and northern Africa. It is the only alder indigenous to Great Britain, where it attains a height of 75 feet and a diameter of 30 inches. The soft, light brown, straight-grained wood is used for many purposes; it has the quality of long endurance under water and was valuable for pumps, troughs, sluices, and piles. It was also used for carts and spinning wheels, chairs, bowls, spoons, wooden shoes, and herring barrel staves. The branches make good charcoal, once used for making gunpowder, being surpassed for that purpose only by some species of willows. The bark, leaves, and fruit have been used in tanning leather, and from the bark and young shoots a yellow dye was obtained. The bark, with copperas, forms a foundation for blacks; when concentrated, it produces an ink. Alone, it dyes woolens a reddish color called Aldine Red.

In some countries it was much planted to prevent the erosion of streambanks, for the matted roots not only protected the banks of soft earth but also provided an element of beauty and shade along the streams. In addition, many alders are prized ornamentals, especially horticultural varieties of the Black and Speckled Alder and the Japanese Alder, A. japonica, which is one of the most beautiful members of the genus. Alders are also useful trees for planting on wet ground, for they thrive under such conditions as would be fatal to most trees. They also succeed in a great variety of soils, including heavy clay.

Bark of the European alder has been used medicinally as a tonic and as an astringent. A decoction of the bark was considered useful in the treatment of swellings and inflammations and as a gargle for sore throat. It has also been used to cure ague. Peasants of the Alps were reported to be frequently cured of rheumatism by being covered with bags full of the heated leaves. The American Indians likewise made use of alder in the treatment of bodily ailments. Josselyn reported in 1672 that "an Indian, bruising and cutting his knee with a fall, used no other remedy than alder-bark, chewed fasting, and laid to it; which did soon heal it." He pronounced a decoction of alder "also excellent, to take the fire out of a burn or scald." "Common alder" was an Onondaga remedy for ague and inflammation. The Penobscots boiled the bark of alder in water to make a drink to stop cramps and retching, while the Montagnais boiled the twigs and drank the brew for "impure blood." Another tribe also used an infusion of alder bark for children's constipation.

The alders of our eastern states are too small to be much used for their wood, except as fuel, as they seldom grow more than 12 or 14 feet high, but they were sometimes used to make the hoops of small casks such as were used to hold nails or gunpowder. With respect to wildlife, however, alders are useful in a number of ways, although Martin et al. (1951) note that their value is low in proportion to their widespread abundance. Bees use the pollen for spring-brood rearing. Their seeds are important in the diet of redpolls, siskins, and goldfinches, and such birds as the sharp-tailed and ruffed grouse eat the leaves and buds (also the seeds to some extent); rabbits and beaver chew the bark, while moose and white-tailed deer often browse on the shoots. Dense copses also provide effective cover from enemies and from unfavorable weather.

It was natural for home dyers living in America to search for coloring materials among the barks of trees which surrounded them; among those frequently mentioned as brown-coloring barks was alder. One New York dye merchant thus described the gathering and use of alder bark: "The sticks are cut in the month of April, or the beginning of the month of May, when the sap runs; the bark is stripped off as soon as cut, (which is easily done by children) and is dried in the shade, when it is fit for use.... This bark, when the colouring matter is strong, produces a brownish drab with alum, and a light forest drab when only a small quantity is used. When employed in the black dye, it increases the body of the colour even more than sumach, and is equally durable."

Key to Local Species of Alnus

1. Leaves usually rounded at base, downy beneath at least on the nerves, doubly serrate with teeth of irregular size, scarcely glutinous when young; in maturity, veins with cross-veins beneath prominent and forming ladder-like reticulations, green beneath; bark bronzy and lustrous with linear transverse lenticils.. A. incana ssp. rugosa
1. Leaves acute or wedge-shaped at base, nearly smooth, evenly serrate with very fine, almost regular teeth, pale glaucous beneath, glutinous when young; in maturity with lower surface with only weak cross-veins; bark dark dull gray with fewer darker lenticils or these obscure.................................... A. serrulata

Álnus incàna (L.) Moench. ssp. *rugòsa* (DuRoi) Clausen. Speckled Alder.

Meaning of Species Name. Hoary; ssp. name, wrinkled.

Synonyms. *A. rugosa* (DuRoi) Spreng. in Fernald (1950) and in Gleason (1952).

Other Names. Hoary Alder, Black Alder, Tag Alder.

Type of Plant. A tall shrub 8-30 ft high, rarely a small tree.

Habitat. Wet soil of low grounds, swamps, margins of streams, and along shores.

Range. Nf to Mack and BC, s to Md, Pa, WVa, O, Ind, and Minn; also in Eurasia.

Distr in NYS. Under *A. incana* (L.) Medic.: Common northw across the state, westw to L Erie; less frequent southw and apparently absent from the coastal plain.

Distr in the Torrey Range. Under *A. incana* (L.) Willd.: NY--Rare on LI n of the moraine; rare in Westchester co, increasing and common northw.

Elevation. Sea level-2800 ft in the Torrey range.

Time of Fl. Mar-May; Mar 20-Apr 20 at Cornell.

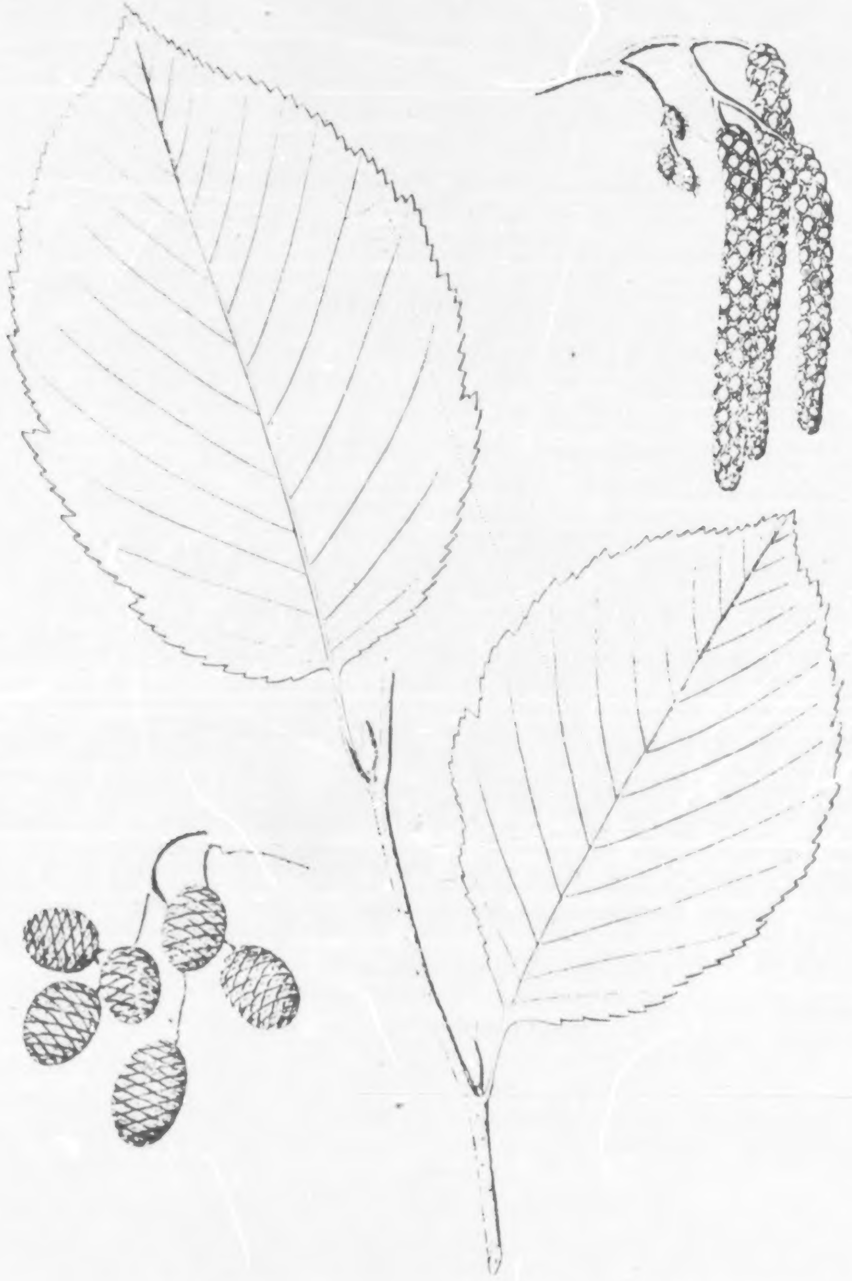
Origin. Native.

Remarks. Wood soft, light brown; wt 28 lb per cu ft.

Speckled Alder is exceedingly common in the Catskills along streams and in swamps. Where the range of this species overlaps that of *A. serrulata*, this plant can be distinguished from the Common or Smooth Alder by the coarsely doubly serrate leaves (almost to the point of being lobed), rounded or heart-shaped (not wedge-shaped) at the base, its erect cones, and by the twigs plentifully speckled with transverse white warty lenticels.

This species, as well as *A. serrulata*, was much used in medicine by the Indians. Vogel (1970) reports that the Potawatomis scraped the inner bark of Speckled Alder and used the juice to rub on the body to cure itch. A bark tea was made for flushing the vagina and to make rectal applications with a homemade syringe to shrivel anal muscles and to cure piles. Potions of bark tea were drunk to cure flux, and the powdered inner bark was used to sprinkle upon galled spots of ponies. The Menominees used the inner bark for poultices on swellings, and an infusion of bark was given to solidify the loose mucus accompanying a cold and as a wash for sores because of its astringent and healing powers. In American medicine, the more southern Smooth Alder was the species usually mentioned in medical books, but Speckled Alder has similar properties. Since the two species are easily confused by the layman, it seems likely that both species were used practically interchangeably.

Densmore (1928) states that the Chippewas not only used the inner bark of this species for dyeing but also used it in medicine as an emetic, to ease difficult labor, and to treat diseases of the eye. For the latter purpose it was combined with equal parts of the roots of *Cornus alternifolia* and *C. stolonifera* to prepare a decoction used as a wash or compress. The emetic was prepared from equal parts of the inner bark of this species and *Viburnum acerifolium*: "In preparing these, scrape the stalks carefully, removing only the thin outer covering and using the green part underneath. Put the scrapings of this green bark from both trees in boiling water to make [a] decoction," which was given internally. Details for treating difficult labor are



Alnus incana ssp. rugosa--Speckled Alder
[From Emerson (1878), Vol. 1, plate facing p. 251.]

given as follows: "In preparing this remedy the root must be scraped upward. A weak decoction is made from a few inches of the root and a pint of water. The following ingredients are added to this: 4 bumblebees are caught and put in a box to die of themselves. In catching the bees they must be stunned but not injured. It destroys the efficacy if the bees are treated otherwise. The bees are dried, ground to a powder, and put in a leather packet until needed. When the medicine is to be used, a pinch of this powder is put in a small half teacup of the above decoction. The dose is about a tablespoonful. Two doses are usually sufficient. A specimen of the bee was obtained and identified as a common bumblebee."

The small trunks make good bean poles and provide good fuel for campfires. In addition, this alder serves to protect the banks of streams from excessive erosion and also furnishes cover for small game birds as well as supplying food for wildlife. Ruffed grouse feed on the buds; muskrats, beaver, cottontail rabbits, deer, and moose browse on the twigs.

Alnus serrulata (Ait.) Willd. Smooth Alder.

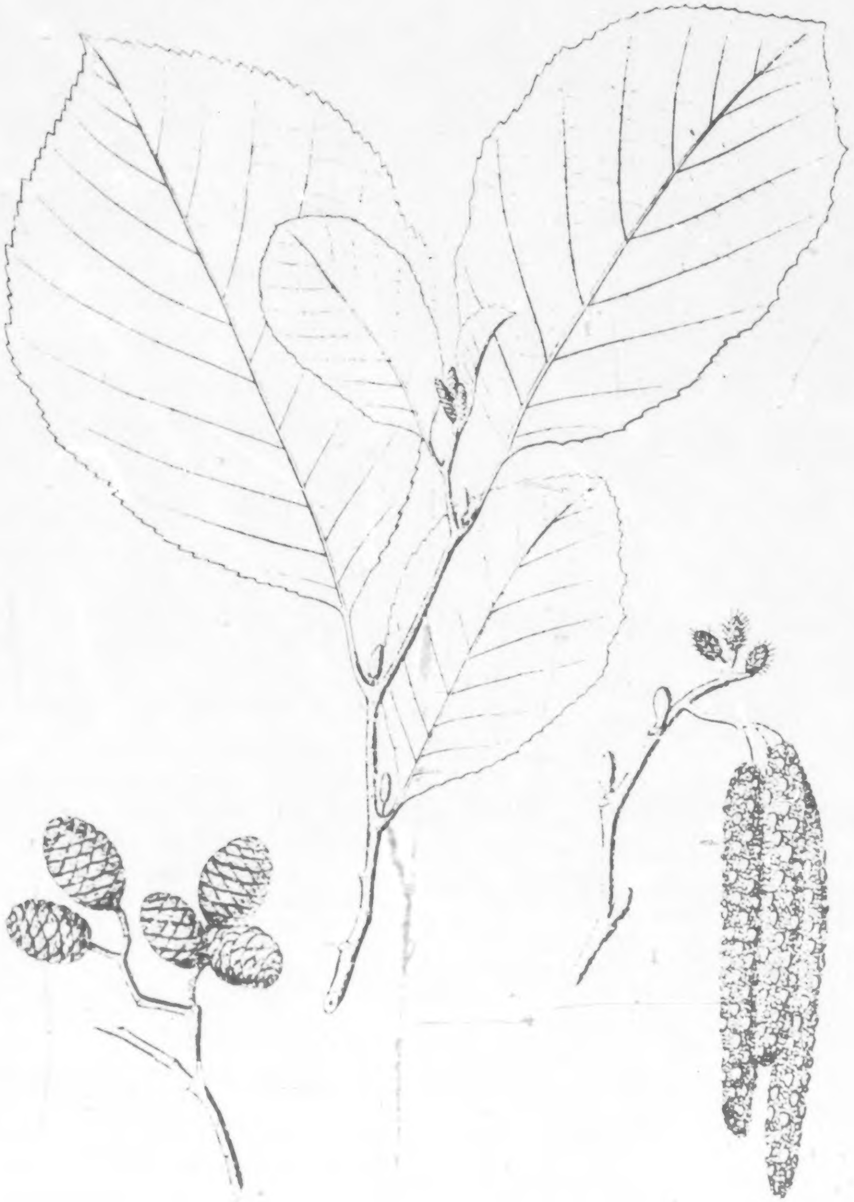
Meaning of Species Name. Finely saw-toothed, from the leaves.
Other Names. Common Alder, Hazel Alder, Tag Alder, American Alder, Green Alder.
Type of Plant. A tall shrub 5-15 ft high, rarely a small tree.
Habitat. Wet soil of swamps, wet woods, stream margins, and the like.
Range. Me to NY, WVa, O, Ind, Ill, Mo, and Okla, s to Fla and Tex.
Distr in NYS. Common across the state, chiefly s of, or outside the Adirondacks.
Distr in the Torrey Range. Throughout the range.
Time of Fl. Feb-May; Mar 20-Apr 20 at Cornell.
Origin. Native.
Remarks. Wood soft, light brown; wt 29 lb per cu ft.

Smooth Alder can best be recognized by its leaves, which are broader near or above the middle and acute at the base, with evenly serrate margins. An infusion of the inner bark of this species was used by the Menominees as an alterative (a drug administered "to alter favorably the course of an ailment") and the Delawares once chewed the bark to make a poultice. Alder bark is an astringent as well as an alterative and in the United States a decoction was sometimes used in domestic practice "to purify the blood," in the treatment of diarrhea and intermittent fevers, and as a gargle in the treatment of sore throat. Seton remarked that a tea made from the leaves was a valuable tonic as well as a useful skin wash for pimples and other skin disorders.

The Smooth Alder can be used in the same ways as the Speckled Alder, but since it is rare in the Catskill region, its usefulness, both to man and to wildlife, is much restricted in that area.

Betula L. Birch.

About 40 species of birch are found throughout the cooler parts of the northern hemisphere, some 15 of which grow in North America. They are mostly trees of medium size, but several of them are merely shrubs. These trees have slender round branches and deciduous serrate leaves, with male and female catkins on the same tree. Catkins of the male flowers are visible on the branchlets almost all winter long, elongating rapidly during the first warm days of spring to sway in the breeze and shower their light dusty pollen in the air to be carried to the female flowers. The latter are borne in



Alnus serrulata--Smooth Alder
[From Emerson (1878), Vol. 1, plate facing p. 248.]

smaller catkins, barely half an inch long, which emerge from ordinary-looking buds on the same branchlets, along with a pair of tiny leaves. The catkins of the pistil-bearing flowers mature as conelike structures during summer or early fall, within which are the small seedlike fruits. These "cones" break up at maturity, releasing the small winged fruits and thin 3-lobed bracts. The bark occurs in fine layers, and in some species the outer layers peel off in thin papery sheets. The name of the genus is derived from the Latin name of the birch. Several other species occur in the western states and a number of exotic species are grown as ornamentals.

Native birches that possess dark bark might be confused with some species of cherries. Birches differ in that (1) broken twigs may have a strong wintergreen odor rather than the sour smell of cherry twigs, (2) bud scales are fewer, (3) leafstalks do not bear glands, (4) the bark of many species can be separated into papery sheets, and (5) the leaves are double-toothed and usually do not taper at the base. The peculiar arrangement of the leaves is another easy way to tell a birch from other trees. On twigs grown during the current season, they appear alternately, but on those of the previous year, they are paired on short spurlike shoots.

Although birches are hardy trees and withstand a considerable amount of exposure, they are comparatively short-lived, but they are often used in horticulture. All our native birches can be grown on lawns and in gardens, plus a number of exotic species, including B. pendula, a handsome European tree with white bark and a graceful habit. There are several varieties of this species, one with purple leaves and another with deeply lobed leaves on pendulous branches.

Several of the birches produce wood of commercial value, much in demand for furniture, agricultural implements, plywood, and interior finish. It is also used in the manufacture of spools, brush backs, clothespins, and a number of other articles. A finely figured kind from Finland, known as Karlean Birch, is popular for cabinets and small fancy articles. In some northern countries birch wood is much sought for fuel, but its quality varies with the species; that of Yellow and Black Birch produces better live coals than that of White and Gray. In several birches the curling older bark is highly flammable; even when damp it provides excellent tinder. Birch tar and oil used in medical practice are obtained by distillation of the wood of Black Birch, and the barks and green shoots of several species have been utilized in dyeing, mainly to produce light reddish browns, dull yellows, blacks, and other drab colors.

The white birches lack the aromatic oil found in the black birches, but their sap, secured in early spring before the leaves unfold, was prized by northern Indians and travelers as a pleasant, sweet drink, and by boiling, it can be reduced to syrup or, finally, sugar; it is also sometimes used in making vinegar. Although in North America birch beer is usually made from the black birches, it is probable that sap of the Paper or Canoe Birch could also be used. Our species is so close to the white birches of Europe that the following recipe of a "Fair Lady" of the 17th century in England may be of interest:

"To every Gallon of Birch-water put a quart of Honey, well stirr'd together; then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scumm'd. When it is sufficiently boil'd, and become cold, add to it three or four Spoonfuls of good Ale to make it work ... and when the Test begins to settle, bottle it up ... It is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite being drunk ante pastum." Modern ale might not produce fermentation so it may be necessary to add yeast to achieve the desired result.

Throughout their natural range Vogel (1970) reports that birch trees were widely used in medicine by American Indians. A decoction of the inner bark of "Mountain birch" was used by Indians west of the Mississippi, according to an 1823 report of John D. Hunter, as a remedy in coughs, colds, and other pulmonary ailments. The cones of Dwarf Birch, *B. pumila*, were heated over coals by the Pillagers to make an incense for catarrh patients, and a tea was brewed from them for women in menses and as a post-parturition tonic. The Catawbas, Speck reported in 1937, boiled the buds of *B. nigra* to a syrup and added sulphur to make a salve for ringworm and sores. The Alabamas of Texas boiled the bark of the same tree for a remedy used in treating sore hooves in horses. Rectified birch-tar oil, listed in the *National Formulary*, 1916-55, was distilled from the dry bark of a foreign species of birch for use externally as a counterirritant, parasiticide, and antiseptic in skin diseases.

Martin *et al*. (1951) remark that the importance of birches to wildlife, although considerable, is confined largely to the north and to northern animals, prominent among which are numerous song and game birds, including ruffed grouse and other large birds (feeding on catkins, buds, and seeds), redpoll and pine siskin (seeds), and browsing or wood-eating mammals such as moose, snowshoe or varying hares, porcupines, and sometimes beaver, particularly when poplars or aspen are not readily available.

Betula alba is a complex circumpolar population of the northern hemisphere, growing almost throughout the greater part of Europe, Siberia, and the cooler portions of North America, in the north reaching the extreme limits of tree growth. It has been classified into several subspecies, the European White or Silver Birch being known botanically as *B. alba* ssp. *alba*, while in the Catskills there are two others, *B. alba* ssp. *papyrifera*, the Paper or Canoe Birch, and *B. alba* ssp. *cordifolia*, the Mountain Birch, much more restricted in distribution. These two subspecies closely resemble each other and have many common properties and practically identical uses, so their separate identities are chiefly of interest only to botanists. In the Catskills, the common white birch is the Canoe Birch; the Mountain Birch is restricted to the higher peaks.

In Europe the White Birch is one of the most widespread and generally useful of trees, particularly in northern areas where other hardwoods are relatively scarce. In those areas it has long been prized as firewood and as a source of charcoal; great quantities of its wood were once used in the smelting furnaces of northern Europe. The wood is light, strong, very close-grained, and not very durable, but being abundant (the tree is able to thrive in almost any situation), it was used for many purposes, including bobbins, wooden spoons, herring-barrel staves, and broom handles. The wood was also highly valued by upholsterers and turners because of its toughness and tenacity. In country districts, particularly, the lighter twigs were employed for thatching and wattles, as well as for brooms, baskets, and ties for faggots.

The bark, being impermeable to water and more durable than the wood, was used in northern countries of Europe for roofing, as a substitute for oiled paper, and for making domestic utensils, boxes, and jars to contain both solid and liquid substances. Even bark shoes were made from it. When the bark is distilled, it yields an oil having the peculiar odor of Russian leather, in the preparation of which it is employed. It likewise imparts durability to leather, and it is owing to its presence that books bound with it are so well preserved. The production of birch tar oil was an industry of considerable importance in parts of northern Europe and Siberia. It has the property of keeping away insects and preventing gnatbites when rubbed on the hands and arms. Formerly the trees were cut down before the removal of the bark, but their increased value led to the adoption of a system of cropping whereby only the outer layers of bark were stripped from the tree, which survives the operation and yields successive crops of bark. Johnson (1867) provides some interesting details concerning the economic value of the European White Birch:

"The timber of the Birch, though seldom very large, is applicable to a variety of purposes, being hard, tough, and tolerably durable, but though in great request in northern countries, is not in as much esteem here as that of some of our other forest trees. It is used by the wheelwright, cooper, and maker of agricultural implements, but chiefly for inferior work. Common chairs, tables, and other articles of furniture, are often made of it, while a large quantity is annually consumed in making herring barrels.

"The young shoots are employed for brooms, the thicker for hurdles, baskets, and hoops for casks. The bark is valuable for tanning, and an empyreumatic oil, obtained from it by distillation, gives the peculiar scent and durable qualities to Russia leather. A decoction of the bark is found to preserve nets and cordage immersed in it better than any other preparation. In Russia it is applied to the same purposes for which that of the canoe birch is used in North America; boats being formed of it, that are nearly as light and portable as those made by the Red Indians of Canada. Strips of it are also formed into shingles for roofing huts, and are said to be remarkably durable ... The quantity of oil contained in the bark is so great, that in Norway twisted slices of it are used for torches. The inner bark is made by the Laplanders into cordage, and, containing some farinaceous matter, is employed in time of dearth as a miserable substitute for bread, being ground up to powder and made into cakes, with or without the addition of such flour as can be obtained.

"When the sap rises in the spring it contains about two per cent. of sugar, and may be fermented into a wine which has a very pleasant flavour, and when bottled becomes bright and effervescent; to add to its strength a portion of sugar is generally added.... The frequent abstraction of the sap of course soon destroys the tree, and many Birches were thus killed near Hamburg, in 1814, by the Russian soldiers, who tapped all the trees they could find, and intoxicated themselves with the fermented juice.... The fresh sap as it is extracted from the tree forms a very pleasant drink, and is supposed by the Highlanders to be beneficial in complaints of the bladder and kidneys.

"Birch-wood is one of the best kinds for burning, giving out a great heat and making a very bright fire, but it is inferior as fuel, in an economical point of view, to beech and oak. The smoke of the green wood and twigs is thought to be better for curing hams, fish, and all smoked meats than that of any other tree.

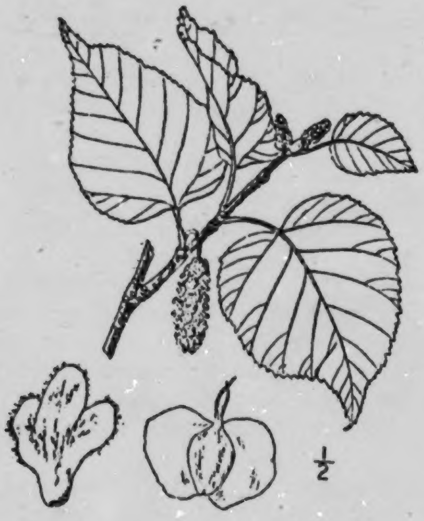
"The leaves of the Birch are used in Northern Europe as a substitute for tea, and the slightly astringent infusion is supposed to be a good medicine in intermittent fevers. The young shoots and leaves are eaten by cattle, but with much less avidity than those of the elm...."

Key to Local Species of Betula--Flowering Plants

1. Fruiting catkins sessile or nearly so; lateral lobes of the scales oblong, divergent or ascending, not overlapping at base; leaves with 8-12 lateral veins on each side; crushed twigs with the flavor of wintergreen, 2
    2. Branchlets and bud scales glabrous; cone scales glabrous, 5-7 mm long; bark dark reddish brown or almost black, not separating in papery layers.................................... *B. lenta*
    2. Branchlets and bud scales at least sparsely hairy; cone scales pubescent, 6-12 mm long; bark yellowish-gray or -brown, often separating in papery layers......................... *B. alleghaniensis*
1. Fruiting catkins distinctly peduncled; lateral lobes of the scales obovate, dilated above the base; trees or shrubs; leaves with 7 or fewer lateral veins on each side; twigs lacking a wintergreen flavor, 3
    3. Bark opaque, chalky or ashy-white, close, the layers not readily exfoliating; leaves glabrous beneath, abruptly ending in prolonged tail-like tips; lateral lobes of scales usually much larger than the terminal.................................. *B. populifolia*
    3. Bark lustrous, creamy- or pinkish-white to warm brown, in maturity often exfoliating or separating into layers; leaves not prominently caudate-tipped, pubescent in the vein axils beneath; lateral lobes of the scales usually shorter than the terminal, 4
        4. Buds scarcely resinous; leaves broadly cuneate to rounded at base, simply serrate.................... *B. alba* ssp. *papyrifera*
        4. Buds lustrous with resin; leaves truncate to subcordate at base, doubly serrate.................... *B. alba* ssp. *cordifolia*

Key to Local Species of Betula--Summer Key

1. Twigs not glandular-warty; bark of trunk not white; leaves with 8 or more pairs of veins, 2
    2. Leaves with lateral veins often with prominent branches; bark solid, not peeling.................................... *B. lenta*
    2. Leaves with lateral veins without prominent branches; bark of trunk peeling in thin layers..................... *B. alleghaniensis*
1. Twigs glandular-warty; bark of trunk white; leaves mostly with fewer than 8 pairs of veins; twigs without wintergreen flavor, 3
    3. Apex of leaves long-tapering; petioles 2-3 cm long; bark of trunk not peeling in layers.............................. *B. populifolia*
    3. Apex of leaves acuminate but not long-tapering; petioles 1-3 cm long; bark of trunk peeling in thin papery layers, 4
        4. Buds lustrous with resin; leaves definitely cordate at base, doubly serrate...................... *B. alba* ssp. *cordifolia*
        4. Buds scarcely resinous; leaves merely rounded to tapering at base, simply serrate............... *B. alba* ssp. *papyrifera*



Betula alba ssp. cordifolia--Mountain Birch
[From Britton (1908), Fig. 207, p. 251.]

Bétula álba L. ssp. cordifólia (Regel) Regel. Mountain Birch

Meaning of Species Name. White; ssp. name, with heart-shaped leaves.
Synonyms. B. papyrifera Marsh. var. cordifolia (Regel) Fern. in Fernald (1950); B. cordifolia Regel in Gleason (1952).
Other Names. Paper Birch, White Birch, Mountain Paper Birch.
Type of Plant. A tree.
Habitat. Moist or dry soil of stony or rocky places and on open slopes.
Range. Nf and Que, s to NY, mts of NC, Mich, Wis, Minn, and Ia.
Distr in NYS. Frequent across the n Adirondacks.
Distr in the Torrey Range. Under B. lutea Michx.: Confined so far as now known to the high peaks of Greene and Ulster co, NY, at elevations exceeding 2800 ft, and to the n shore of LI; not s of the moraine.
Time of Fl. Late May-Jun.
Origin. Native.

This subspecies is distinguished from the more common Paper Birch by the heart-shaped bases of its leaves, which are doubly serrate. It occurs occasionally throughout the general range of the Paper Birch in the northeastern states, but in the Catskills it occurs only at higher elevations in the mountains.

Bétula álba L. ssp. papyrífera (Marsh.) Regel. Paper Birch.

Meaning of Species Name. White; ssp. name, bearing paper.
Synonyms. B. papyrifera Marsh. in Fernald (1950) and in Gleason (1952).
Other Names. White Birch, Canoe Birch, Silver Birch, Bolean Birch, Spool-wood.

Betula alba ssp. papyrifera--Paper Birch
[From Sargent (1891-1902), Vol IX, Plate 451, p. 57.]

Type of Plant. A tree or coarse shrub attaining a maximum height of 80 ft and a trunk diameter of 3 ft.

Habitat. Woods, especially on slopes, in stony or sandy soil.

Range. Lab to Ak, s to NJ, Pa, WVa, O, Ind, Ill, Ia, SD, etc.

Distr in NYS. Common throughout the Adirondack reg and the n counties of the state; less common southw to Dutchess co and the Catskill mts, Delaware and Broome co, and locally westw to L Erie; reported from LI.

Distr in the Torrey Range. NY: Dutchess co, increasing but not very common northw.

Elevation. Sea level-2000 ft in the Torrey range; has been observed at 3000 ft in Delaware co.

Time of Fl. Late Apr-Jun; May 15-30 at Cornell.

Origin. Native.

Remarks. Wood hard, strong, reddish-brown; wt 37 lb per cu ft.

No other American birch has so wide a natural range. At all seasons of the year mature specimens of Paper Birch can be identified by the creamy white bark that peels off in thin papery layers, exposing the orange-colored inner bark. Wherever it grows, it delights in the company of conifers and in the presence of water. Being light-tolerant in youth, it comes up readily on cut-over land; over much of New England, eastern Canada, and the northern peninsula of Michigan it has replaced White Pine and the spruces. While it is usually a comparatively short-lived tree, specimens have been known to live 140 years.

In North America the classical use of this tree was for making the light and graceful birch-bark canoes of the Indians, who taught the white man how to make them. Other barks and even animal skins were also used for canoes, but none could surpass the birch-bark canoe, the making of which is well described by Michaux (1853): "To procure proper pieces, the largest and smoothest trunks are selected: in the spring, two circular incisions are made, several feet apart, and two longitudinal ones on opposite sides of the tree; after which, by introducing a wooden wedge, the bark is easily detached. These plates are usually ten or twelve feet long, and two feet nine inches broad. To form the canoe, they are stitched together [over a wooden frame] with fibrous roots of the white spruce, about the size of a quill, which are deprived of the bark, split, and suppled in water. The seams are coated with resin of the Balm of Gilead. Great use is made of these canoes by the savages and by the French Canadians, in their long journeys into the interior of the country: they are very light, and are easily transported on the shoulders from one lake or river to another ..."

In addition, birch bark had a host of other uses. When the skins of large animals could not be obtained, it was sometimes used as a covering for wigwams or tepees (tied in place with spruce rootlets) and for utensils of many kinds, such as drinking cups, boxes, baskets, bags, makeshift shoes, emergency snow goggles, dishes, and even for containers in which to heat water. Michaux (1853) also enumerates other uses made of this bark during the early 1800's: "In Canada and the District of Maine, the country people place large pieces of it immediately below the shingles of the roof to form a more impenetrable covering for their houses; baskets, boxes, and portfolios are made of it, which are sometimes embroidered with silk of different colors; divided into very thin sheets, it forms a substitute for paper; and, placed between the soles of the shoes and the crown of the hat, it is a defence against humidity."

Emerson (1878) reported that "In the settlements of the Hudson's Bay Company, tents are made of the bark of this tree, which, for that purpose, is cut into pieces twelve feet long and four feet wide. These are sewed together by threads made of the white spruce roots, ... and so rapidly is a tent put up, that a circular one twenty feet in diameter and ten feet high, does not occupy more than half an hour in pitching. The utility of these ... tents ... is acknowledged by every traveler and hunter in the Canadas."

The bark is very inflammable, even when wet, so it makes good tinder for kindling a fire even in the wettest weather. The sweet sap, which flows freely in early spring from wounds made in the trunk, furnished the Indians with a pleasant cooling drink; by boiling, it could be made into syrup. For emergency food the inner bark was pounded to yield a flour. Bark should never be peeled from a standing tree, however. Peeled trees do not develop new white bark; instead, a black ring remains where the bark was removed, thus disfiguring the tree.

The wood of the Paper Birch is light, strong, hard, and very close-grained, but it is easily worked and was used by the northern Indians for hatchet handles, sledges, snowshoe frames, and paddles. Although lumbermen of earlier days had little use for the wood itself, they were astute enough to put thin layers of the bark inside their boots to prevent the access of moisture. While the wood is perishable when exposed to the weather, studs made of it have been known to last over half a century. In earlier times the wood, which takes a fine polish with a pearly luster, was used in cabinet work and in the manufacture of chairs, and the beautifully feathered and variegated grains obtained from the junction of the trunk and a large branch were much prized for tables and bureau fronts--uses which modern cabinet-makers are beginning to appreciate since other woods are becoming acarce. For the most part, however, its wood is more often used as fuel and to make such things as toothpicks, spools (for which purpose it is preferred to the wood of other trees), woodenware, clothespins, hat-blocks, shoe lasts, and various small turned articles.

In 1932 H. H. Smith reported that the Ojibwas used the root of Paper Birch in medicine as a seasoner to disguise unpleasant tastes; it was also cooked with maple sugar to make a syrup for stomach cramps. In addition, they steeped the inner bark to prepare a medicinal enema. The Chippewas likewise used the bark of this species for treating pains in the stomach. Bark of the Paper Birch and Balsam Fir was grated and eaten by the Montagnais as a beneficial addition to their diet, and the Chippewas used the inner bark of the Paper Birch for dyeing.

The buds are an important winter food of the ruffed grouse, and various species of finches, sparrows, and small rodents feed on the seeds. The bark is eaten by the varying hare, but the winter twigs are only casually browsed by the white-tailed deer, although moose sometimes find them more palatable. The inner bark is a favorite of the beaver when poplar or aspen fails.

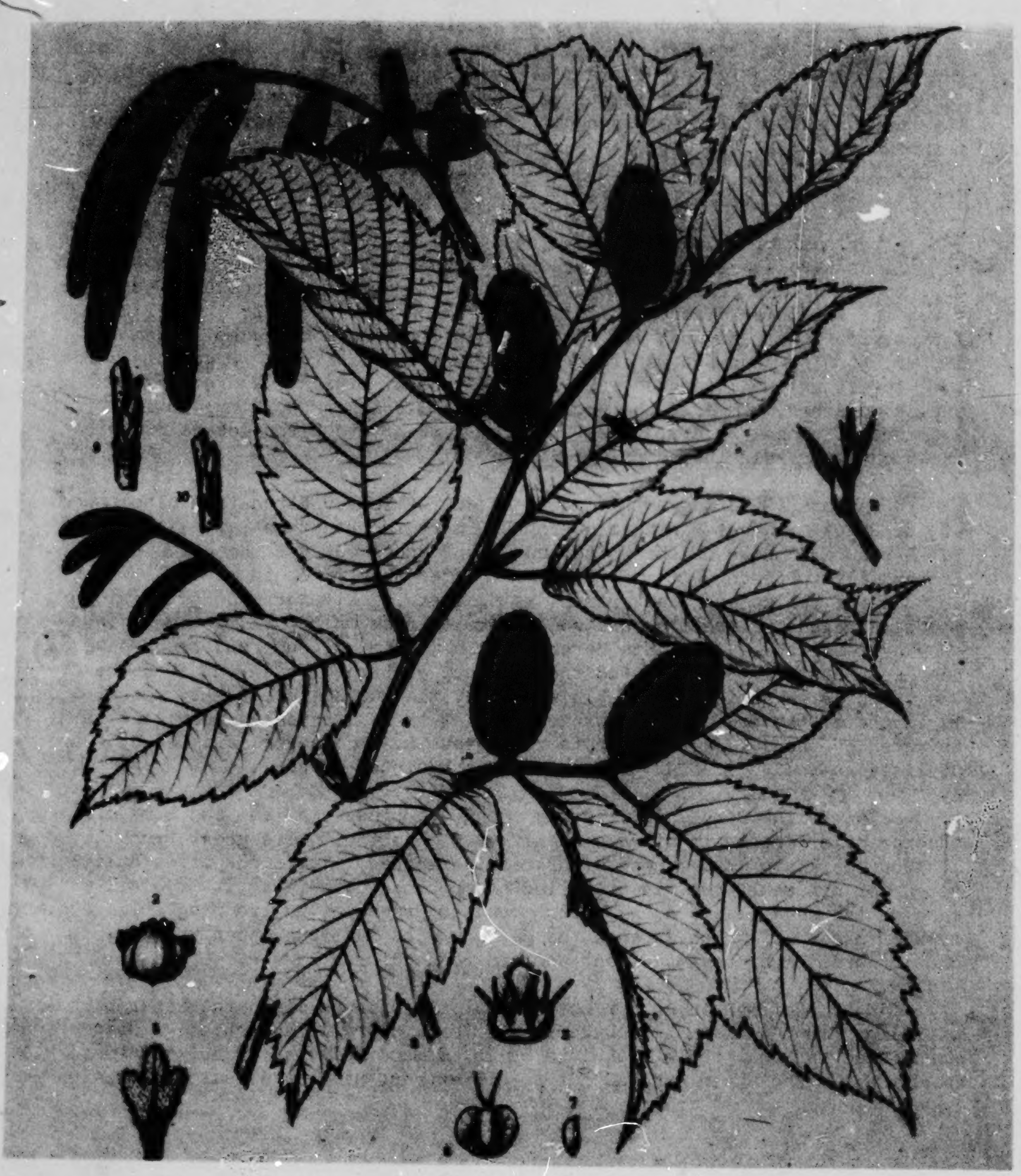
With its gleaming white trunk and luxuriant dark foliage, its compact symmetrical habit of youth, and the open airy and graceful head which it bears at maturity, the Paper Birch is always a picturesque feature of the forest. It makes a very attractive ornamental tree and has often been planted, particularly in New England, where it is one of the best-loved trees of the landscape; on the other hand, it has seldom been grown with much success south of its natural boundaries.

Betula alleghaniensis Britt. Yellow Birch.

Meaning of Species Name. Of the Allegheni̇es.
Synonyms. B. lutea Michx. f. in Fernald (1950) and in Gleason (1952).
Other Names. Gray Birch, Swamp Birch, Silver Birch.
Type of Plant. A large tree reaching a maximum height of 100 ft and a trunk diameter of 4 ft, but usually only 60-80 ft tall with a trunk 2-4 ft in diameter.
Habitat. Rich woods.
Range. Nf to Man, s to Del, Pa, upland to NC, Ga, and Tenn, WVa, O, Ind, Ia, and Minn.
Distr in NYS. Common in the Catskills and the Hudson highlands, southw and westw; very common northw across the state, especially in the Adirondack reg and westw along the Great Lakes.
Distr in the Torrey Range. NY: Bronx and Westchester co, highlands of the Hudson, increasing northw and westw.
Elevation. Sea level--2200 ft in the Torrey range; has been observed at 3000 ft in Delaware co.
Time of Fl. Apr-Jun; Apr 30-May 20 at Cornell.
Origin. Native.
Remarks. Wood hard, strong, light brown; wt 41 lb per cu ft.

Yellow Birch, one of the largest of the eastern hardwoods, is one of the principal members of the beech-birch-maple forest association that now covers much of the Catskills. It is also the most valuable of all our birches from the commercial standpoint, probably furnishing three-fourths of the lumber marketed under the name "birch," some 145,000,000 board feet being cut annually in the United States. At all seasons the mature tree can be recognized by its lustrous amber-yellow to silvery-gray bark that peels horizontally into thin papery curled strips, giving the trunk a rather ragged appearance. It requires a cool, moist habitat for its best development, but it often grows in very rocky areas.

The hard, strong, close-grained wood is as heavy as that of Red Oak and has a fine uniform texture. In earlier days it was much used by shipbuilders for the parts of vessels continually under water, and it made good ox yokes because it was both light and strong. Also, because it grips with unrelaxing strength, it was much used for wheel hubs; the spokes never worked loose and no normal strain could crack them. It is now used extensively for furniture, flooring, woodenware, interior finish, veneer, baskets, boxes, and crates. Bending readily, it is particularly adapted to the making of the posts and bars of chairs. It has also been used for the staves of small and inferior casks, for boot-trees, and for joists and bedsteads. The nearly white sapwood is customarily deepened to a pale gold by stains and varnishes, but it is also often stained for cherry and mahogany finishes. In



Betula alleghaniensis--Yellow Birch
[From Sargent (1891-1902), Vol. IX, Plate 449, p. 53.]

some specimens fancy figures are revealed when it is made into veneer.

This species also once provided excellent fuel wood and was likewise much in demand for making charcoal and chemicals by distillation. The thin curls of bark are highly inflammable, even when wet, and are often used by campers as tinder for starting fires. Care should be taken, however, not to mar the appearance of trees in public parks and along trails. Oil of wintergreen occurs in the sap, leaves, and bark, but not in such abundance as in Black Birch. It is said that a palatable tea can be brewed from the leaves.

The bark of this species has been used to dye wool a dark yellow-tan as well as a yellow-brown. The leaves also can be used, either fresh or dry, to dye wool a yellow-tan by using an alum mordant. Adrosko (1968) gives the following directions for using Yellow Birch leaves: "Cover the leaves with water and soak overnight. The following morning boil them for 1 hour, strain, then add water to make a dyebath of 4 to 4 1/2 gallons. Before immersing the mordanted wool in the dyebath, rinse it and squeeze out excess moisture. Immerse the wool; heat the dyebath to boiling; boil for 30 minutes, rinse and dry." Use 3/4 of a peck of dry birch leaves or twice the amount of fresh leaves per pound of wool.

Harlow (1957) suggests that the seeds of Yellow Birch (and also those of the Black or Sweet Birch) are probably more important as late winter food for birds than those of the White and Gray Birches because the cones of the latter fall to pieces within a few weeks after they ripen in the fall whereas those of Yellow and Black Birch disintegrate slowly throughout the winter, meantime releasing their seeds, which come to rest on top of the snow where they are available. "In late March after a windstorm, numerous seeds have been seen cast in this way, and the presence of bird tracks indicated the use of these seeds for food." In addition, the twigs are eaten by moose, and it is one of the preferred browse species of the white-tailed deer; the bark is eaten by the varying hare, cottontail rabbit, and beaver; and the buds are utilized as food by ruffed grouse during the winter season.

The Yellow Birch, as it grows among the pines, maples, and elms of the northern forest, is often a magnificent object with its great trunk, lustrous bark, and broad head of graceful branches. It is not often cultivated for ornament, but, in traveling through the Catskills, it is often seen on the edge of a wood with its abundant green, often drooping foliage, between masses of which is seen the gleam of its lustrous, pearly trunk, showing what might be its effect when introduced on a lawn.

W. J. Hoffman in 1885 reported that the Ojibwas mixed the inner bark of Yellow Birch with that of Sugar Maple for a diuretic decoction, a usage considered rational and efficacious by Dr. Edmund Andrews. The Potawatomis used the twigs of this species for an oil extract used as a medicinal seasoner.

Betula lenta L. Black Birch.

Meaning of Species Name. Tough or flexible, from the twigs.
Other Names. Cherry Birch, Sweet Birch, Mountain Mahogany, Spice Birch, River Birch, Mahogany Birch.
Type of Plant. A medium- to large-sized tree, commonly 50 to 60 ft high with a trunk diameter of 2-3 ft.
Habitat. Rich woods and mountain slopes, sometimes in swamps.
Range. Me to Que, s to Del, mts to Ga, Tenn, and Ky.
Distr in NYS. Common across the middle part of the state but less frequent northw to L Champlain and St Lawrence co, chiefly outside the Adirondacks, and southw to LI.
Distr in the Torrey Range. Throughout the range except the pine barrens, where wanting; rare on the coastal plain.
Elevation. Has been collected at 1800 ft in Delaware co.
Time of Fl. Mid-Apr-May; Apr 30-May 20 at Cornell.
Origin. Native.
Remarks. Wood hard, strong, dark brown; wt 47 lb per cu ft.

The lustrous mahogany-red bark on the trunk of a young Black Birch much resembles that of the wild Black Cherry, so it is often called Cherry Birch. The name Sweet Birch alludes to the marked wintergreen odor and taste of its slender twigs, a characteristic that it shares with the less aromatic Yellow Birch. When young Yellow and Black Birch trees are growing together, they look and smell much alike, but the reddish-brown twigs, branched leaf veins, and hairless twigs and buds should help to distinguish the Black Birch. It attains its greatest size in the Appalachians of Tennessee, but it is slow-growing, taking some 150 years to reach maturity. It is one of our most beautiful forest trees, particularly in early spring when its long staminate catkins hang from the leafless branches, changing them for a few days into fountains of golden spray and making it the most conspicuous of the American birches.

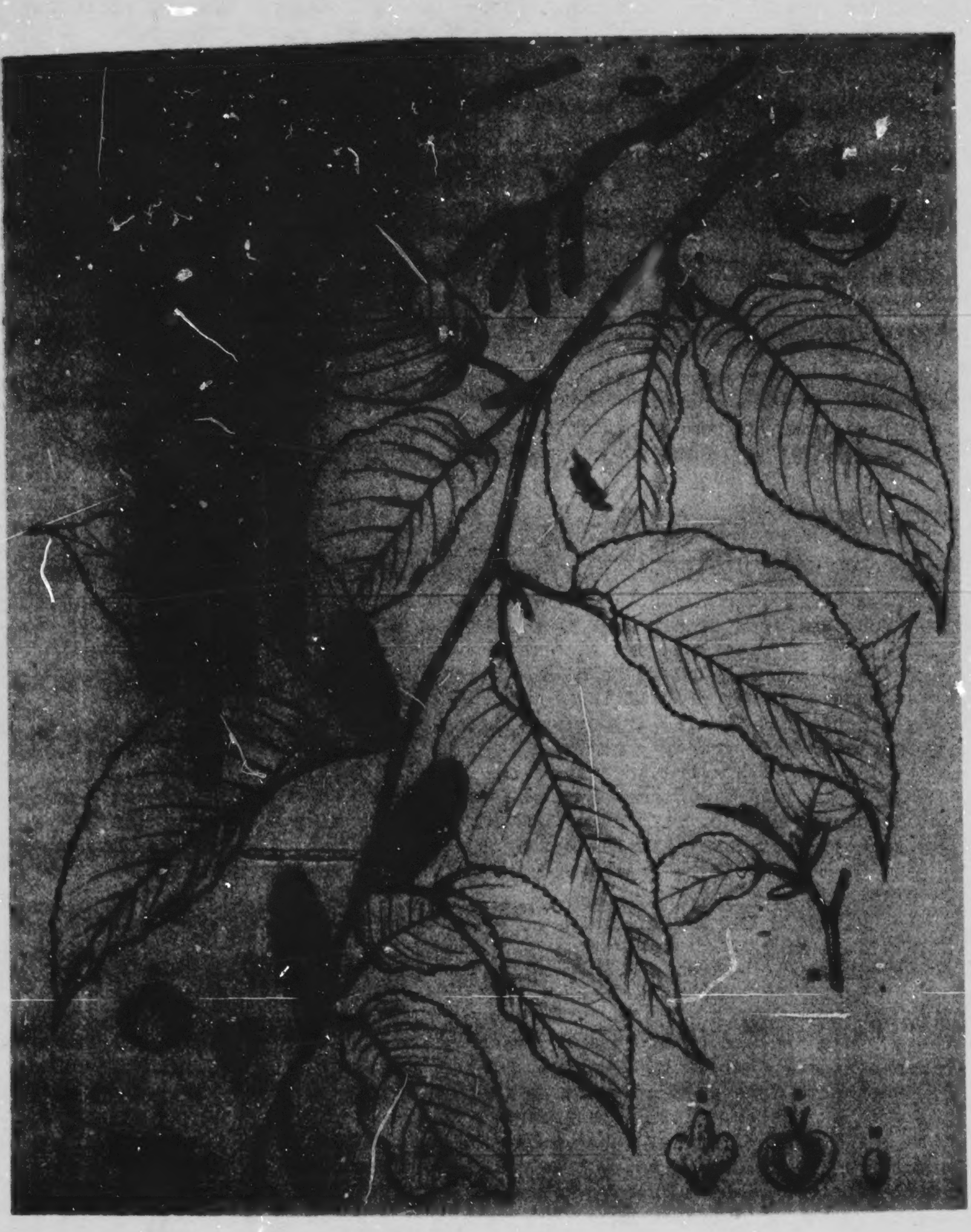
The wood of this species is hard, close-grained, strong, as heavy as that of White Oak, with a satiny surface susceptible of receiving a beautiful polish, so lumbermen take much interest in it. Since all birches emerge from the sawmill simply as "birch," however, it is not possible to distinguish the species from which it came. "Birch" ranks fifth in the amount of timber cut in the United States, most of which is Yellow Birch, but Black Birch undoubtedly takes second place, with Pennsylvania and West Virginia yielding the largest cuts. Its wood tends to warp and is hard to season, so it was not until dry kilns were used that it began to be heavily cut and the supply is now constantly diminishing. It is used for the same purposes as that of Yellow Birch, being much in request for the headboards of bedsteads, other cabinet furniture, and for chairs, for which it is a beautiful material, though it does not bend so well as Yellow Birch. Rare "curly" and "wavy" grains are especially valuable in the making of veneer and furniture. It has sometimes been sold as "mountain mahogany," for on exposure to air the wood slowly deepens in tone and old furniture made from Black Birch much resembles Mahogany in color. In the maritime provinces of Canada it was at one time much used in ship- and boat-building. It is also an excellent firewood, burning with a clear, hot flame. The bark of this species, which is very long-lasting, was sometimes used for roofing. A decoction of the bark, with copperas, has been used for coloring wool a permanent reddish drab.

The taste, odor, and chemical composition of the oil of wintergreen in the twigs and inner bark of this tree are identical with that of the oil originally obtained from the Wintergreen Berry, a member of the Heath family. The quantity that could be produced from the tree far exceeded that available from the true Wintergreen Berry, however, so during the last century mountaineers of the Appalachians cut down thousands of sapling trees to distill the oil. Young trees were cut down, hauled to the distillery, and cut into pieces 1 or 2 inches long. These were put into large stills consisting of wooden boxes with copper bottoms, macerated in water, and distilled over a wood fire. The vapor was carried into a copper or tin coil placed in a barrel and cooled by cold water from a mountain stream. It took about 100 saplings to produce 1 quart of oil in their crude mills, later refined by wholesale druggists for use in medicine and to flavor candy and chewing gum. Chemically known as methyl salicylate, the oil was long used to relieve the pain of arthritis and rheumatism. Today oil of wintergreen is nearly all made synthetically from wood alcohol and salicylic acid, but there is still a market for the natural product, particularly for use in medicine.

When Dr. Clapp compiled his "Report on Medical Botany" in 1852, B. lenta (and B. nigra) was listed in the U.S. Dispensatory. The bark and small twigs were sometimes used in infusion as an aromatic diaphoretic. On distillation they yield an oil that was official in the U.S. Pharmacopeia, 1894-1916, and remains one of the officially recognized forms of methyl salicylate. It is reported to act as a stimulant, diuretic, and astringent.

Sap from the tree, gathered in April in the Catskills (its season is about a month later than that of the Sugar Maple), has a good flavor right from the tree, but it can be boiled down to make a syrup with a flavor suggesting that of sorghum molasses. In districts where no Sugar Maple was found, the Indians used the sap from this tree instead to make syrup and sugar. It is only about half as sweet as the sap of the Sugar Maple, however, requiring about 10 gallons of sap to make 1 pint of syrup. A much better-known product is birch beer, made from the fermented sap of this species. One recipe says simply to tap the tree, put the sap into a jug, throw in a handful of shelled corn, and let nature do the rest. Gibbons (1962) offers a much more sophisticated recipe, however, suggesting stirring 1 gallon of honey into 4 gallons of birch sap and boiling this mixture for 10 minutes before pouring over 4 quarts of finely cut twigs in a 5-gallon crock. When this mixture has cooled, strain the liquid to remove the twigs and return the liquid to the container. On a slice of toasted rye bread spread 1 cake of soft yeast and float it on top of the liquid, cover, and let stand for about a week, until the cloudiness just starts to settle. It is then ready to put into bottles, which are then tightly capped, and stored in a cool dark place for later use. "This is one birch beverage that is definitely not suitable for children," he comments, "as it has a kick like a mule." In Maine the sap is occasionally converted into vinegar.

The inner bark from the stumps and roots of this tree, as well as the twigs cut into small pieces, can be used to make a delightful wintergreen-flavored tea, once much favored by the Indians. Simply cover the bark or twigs with boiling water (birch sap is better if it is available) and let it steep for a minute or two. Strain the liquid and sweeten to taste, adding a little cream if desired. The inner bark can be gathered in spring or early summer (when it peels best), cut into small pieces, dried at room temperature,



Betula lenta--Black Birch
[From Sargent (1891-1902), Vol. IX, Plate 448, p. 50.]

and stored in sealed jars to have the makings of birch tea throughout the year, for it will keep for months without losing its spicy flavor. This tea is an agreeable, gently stimulating, diaphoretic and astringent drink. A decoction or syrup made from the inner bark "makes an excellent tonic for dysentery" and was once thought useful in the treatment of "gravel and female obstructions." The leaves have also been used to make birch tea. The Indians had still another use for this bark, for Josselyn, quoted in Sargent (1891-1902), reported that "the bark ... is used by the _Indians_ for bruised Wounds and Cuts, boyled very tender, and stampt betwixt two stones to a Plaister, and the decoction thereof poured into the Wound; And also to fetch Fire out of Burns and Scalds." In some areas the inner bark is said to be eaten in spring, cut into strips like vermicelli. It is claimed that in 1861 the edible bark of Black Birch probably saved the lives of hundreds of Garnett's Confederate soldiers during their retreat over the mountains to Monterey after the battle of Carricks Ford.

Buds and seeds are eaten by ruffed grouse; twigs are browsed by white-tailed deer, moose, cottontail rabbit, and the varying hare; and the seeds are eaten by many small birds and mammals.

Betula populifolia Marsh. Gray Birch.

Meaning of Species Name. Poplar-leaved.

Other Names. White Birch, Fire Birch, Oldfield Birch, Poverty Birch, Broom Birch, Pin Birch, American White Birch, Poplar-leaved Birch, Wire Birch, Small White Birch.

Type of Plant. A small, short-lived tree with a maximum height of 45 ft and a trunk 1 1/2 ft in diameter, but usually only 20-30 ft high with a trunk diameter of 6-12 in.

Habitat. Sterile dry or wet soil of upland woods and old fields, often in sandy or rocky places.

Range. NS to Que and Ont, s to Del, Pa, Va, O, and Ind.

Distr in NYS. Common in the e and c portions of the state and throughout most of the Adirondack reg at lower elevations, and the St Lawrence basin; rare in the n Adirondacks, not reported from the Chenango and Chemung valleys, and common in the Ontario lowlands but rare in the highlands of c and w NY.

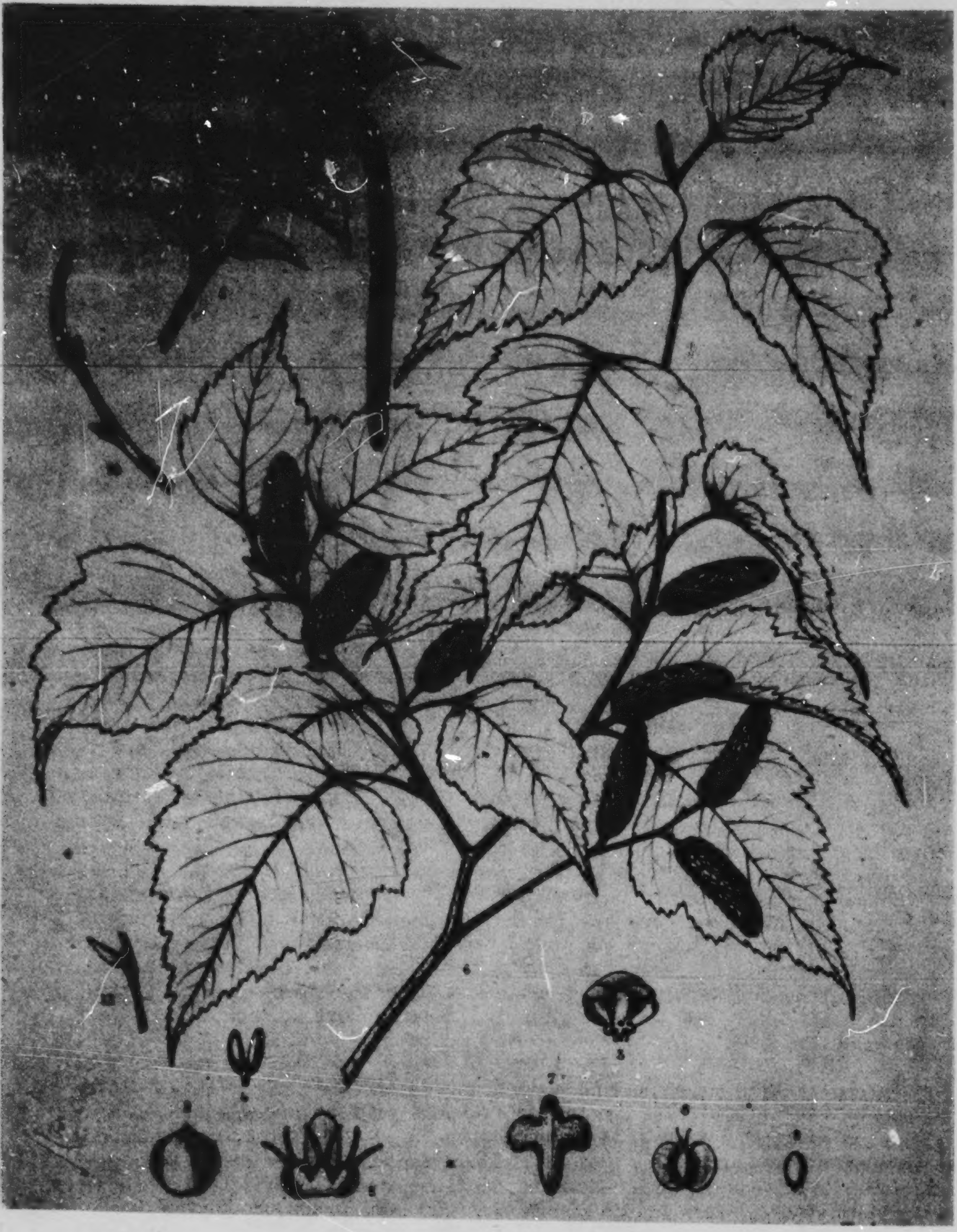
Distr in the Torrey Range. Throughout the range except in s Pa.

Time of Fl. Mid-Apr-May.

Origin. Native.

Remarks. Wood soft, weak, light brown; wt 36 lb per cu ft.

This species is often appropriately called Poverty Birch or Oldfield Birch because it grows so profusely on the most sterile and barren of soils, but another of its common names, White Birch, is better reserved for _B. alba_ to avoid confusion. At all seasons the larger trunks are very characteristic with their close-fitting, chalky-white bark, and the conspicuous dark, triangular-shaped blotches below the branches. The long-pointed leaves and hairless rough-warty twigs are also distinctive. This birch, like Trembling Aspen, is short-lived and more or less of a "weed tree," aggressively invading abandoned fields and burned-over forest areas, growing faster than almost any other tree. Its greatest value lies in its power to spring up profusely on sterile soil and in the protection it affords to seedlings of more



Betula populifolia--Gray Birch
[From Sargent (1891-1902), Vol. IX, Plate 450, p. 55.]

valuable but more slowly growing trees; on good land it may advantageously be cut every 10 years. This species, with its pale bark and its lustrous leaves fluttering on their long stems as freely as those of the aspens, is an interesting and sometimes a picturesque tree, often planted as an ornamental. The short life of the tree, however, and the flexibility of its slender trunks, which are often bent to the ground and injured by ice and snow, make it one of the least desirable of American trees for horticultural use.

Its wood is light, soft, and close-grained, but neither strong nor durable, and is liable to check badly in drying. Although it never reaches sufficient size to become of much commercial value, the wood is sometimes used for paper pulp and to make such things as barrel hoops, toothpicks, spools, and other small turned woodenware articles. It makes good charcoal and good fuel, less valuable, doubtless, than that of most other hardwoods, but ranking with the evergreens and burning with a clear bright flame, the resinous bark igniting quickly.

Its seeds and buds are eaten by ruffed grouse and several songbirds; the twigs are apparently only casually browsed by white-tailed deer, but in some areas the trees are cut by beaver, although it is not a preferred item in its diet.

Corylus L. Hazelnut.

This is a genus of about 15 species of the north temperate zone, mostly hardy nut-bearing shrubs or small trees, natives of Europe, Asia, and North America. They have thinnish, doubly toothed leaves and flower in early spring. The name of the genus is the classical name, probably derived from the Greek *korys*, a helmet or hood, referring to the involucre or husk surrounding the nut. The various species of *Corylus* are quite beautiful during early spring, for at that time the yellow drooping catkins of the male flowers are bright and attractive. The female flowers are small, red, and not easily seen unless a close search is made.

These trees and shrubs bear edible nuts, the most important of which are the European filberts, one species having been cultivated by the Romans, apparently reaching Italy from Pontus by way of Macedonia and Thrace. It was later introduced in Germany in the 16th century. The best nuts now come from Spain. They form an important article of food in some areas of India, and in parts of Russia they are so plentiful that an oil used as food is expressed from them.

In England the hazel has been planted for its wood, from which a special charcoal is obtained for use by artists and engravers as drawing pencils. Being extremely tough and flexible, the wood has also been used for javelin shafts and for fishing poles, and the roots have been employed by cabinet-makers for veneering. Chemists consider the oil obtained from hazelnuts perfect as a base in the manufacture of some types of perfume because it mixes easily and retains odors. Chips of the wood have also been used in many wine-producing countries of Europe to clarify turbid wine. One variety with purple leaves is an excellent shrub for decorative purposes in the garden.

The nuts of both species occurring in the Catskills are sweet and similar in quality to the European filbert; they are popular with children and adult residents of country districts, where the nuts are sometimes gathered for winter use. When ground into meal they make a delicious cake-like bread comparable only to filbert bread.

Martin et al. (1951) remark that the low dense growth of these spreading bushes makes them useful for cover for wildlife and as nesting sites for a number of birds. Squirrels, chipmunks, and other rodents feed on the nuts; grouse commonly eat the catkins; and rabbits, deer, and moose browse on the twigs. Beaver and the varying hare also make use of the nuts, stems, and foliage.

Key to Local Species of Corylus

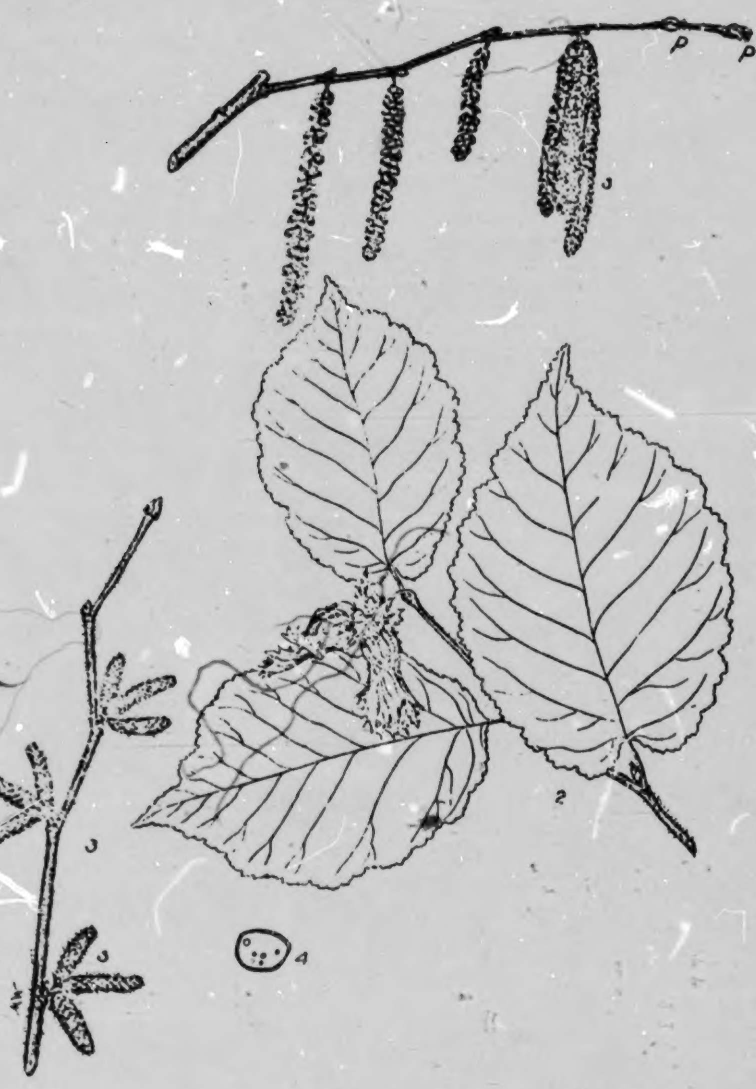
1. Bud scales imbricated, several scales shorter than the bud; staminate catkins distinctly peduncled; twigs, especially at tip, and petioles coarsely glandular-bristly; husk of fruit short, spreading, exposing the top of the nut.......................... *C. americana*
1. Bud scales, except the 2 lower ones, as long as the bud; staminate catkins sessile or nearly so; twigs mostly glabrous; husk of fruit elongated into a tube much exceeding the nut......... *C. cornuta*

Corylus americana Walt. American Hazelnut.

Meaning of Species Name. American.
Other Names. American Hazel, Hazelnut, Filbert.
Type of Plant. A shrub 3-8 ft tall.
Habitat. Borders of woods, open thickets, fencerows, and roadsides.
Range. Me to Sask, s to Ga, Kan, Mo, and Okla.
Distr in NYS. Frequent or locally abundant across the state s of the Adirondack reg; rare in the pine barrens of LI, and not common in the w counties of the state.
Distr in the Torrey Range. Throughout the range except in the pine barrens and e and s of them, and usually increasing northw.
Time of Fl. Mar-May, fr Jul-Aug; fl Mar 20-Apr 20 at Cornell.
Origin. Native.

This is a much-branched shrub, often growing in large spreading clumps. The young twigs and shoots are brown, densely covered with rough pinkish hairs. This new growth later becomes smooth. The alternate, simple leaves, on short petioles, are ovate or broadly oval, rounded or heart-shaped at the base, sharp-pointed at the apex, and with toothed margins. The slender, staminate catkins, 3 or 4 inches long, usually occur singly in the axils of last year's leaves, while the fertile flowers develop from scaly buds near the ends of the branches. The nut, which resembles the European filbert in flavor, is partly or nearly enclosed in an involucre composed of two leaf-like bracts, fringed on the margin. Its autumnal foliage is quite striking and varied, enhancing its ornamental value.

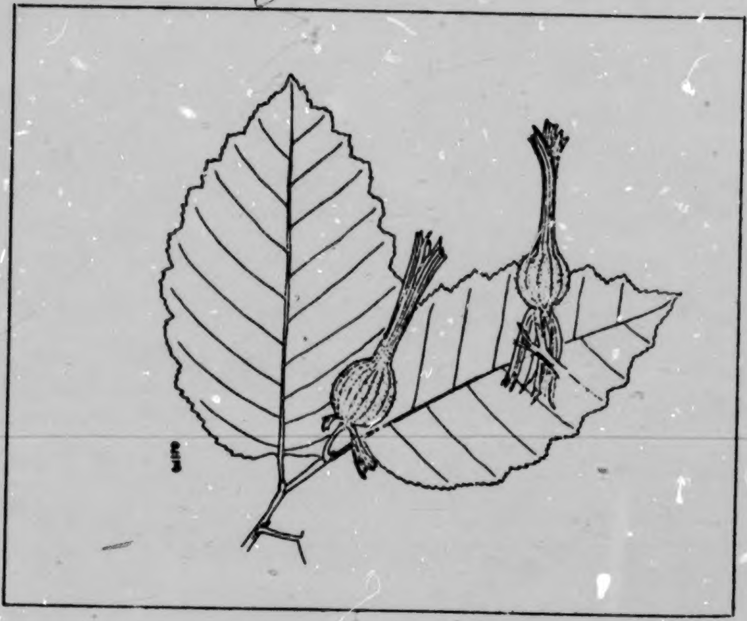
The nuts are generally ripe in August but remain on the bushes until late in the fall if not removed by animals, for anyone who has tried to collect these nuts in late summer has found that he is not alone in appreciation



Corylus americana--American Hazelnut
[From Illick (1919), Plate 51, facing p. 126.]

of them. The chipmunk is especially fond of them, and as this little squirrel cannot climb tall trees, this bush grows at the right height for him. They are also eaten by squirrels, jays, deer, grouse, quail, and pheasant. In areas where it was plentiful, the nuts were extensively gathered as food by the Indians. Densmore (1928) reports that in addition to its food value the Chippewas obtained a dye from this species, used its wood for making drumsticks and other small articles, and employed it in the treatment of convulsions, for which purpose the branches were burned and the charcoal, combined with bear's gall, was "pricked into the temples with needles."

The hazelnut makes up in quality what it lacks in size. It is one of our finest nuts and, if carefully cultivated and selected, might rival the European filbert. It is certainly equal to the latter species in quality,



Corylus cornuta--Beaked Hazelnut
[From Billington (1949), Fig. 26, p. 86.]

but the nuts are smaller and thicker-shelled than those of the European filbert.

Corylus cornuta Marsh. Beaked Hazelnut.

Meaning of Species Name. Horned, from the tubular involucre.
Other Names. Beaked Hazel.
Type of Plant. A shrub from 3 to 6 ft high.
Habitat. Rich thickets, clearings, fencerows, and borders of woods.
Range. Nf to BC, s to NJ, Pa, O, Tenn, and Mo; along the mts to n Ga; and in the w to e Kan, Col, and Ore.
Distr in NYS. Common throughout the n part of the state, less frequent s of the Mohawk valley and southw on the highlands of the Hudson valley, the Catskill mts, Chenango, and Tioga co, and rare westw to L Erie; apparently absent from the Ontario lowlands.
Distr in the Torrey Range. NY: In the highlands of the Hudson, increasing but not very common northw.
Elevation. Sea level-2000 ft in the Torrey range.
Time of Fl. Mar-May, fr Aug-Sep; fl Mar 20-Apr 20 at Cornell.
Origin. Native.

The Beaked Hazelnut is a more northern species than the preceding and in many respects similar to it, but the young twigs and foliage are less hairy. The leaves are narrowly oval, slightly heart-shaped, apex-pointed, and irregularly saw-toothed on the margins. The most striking characteristic of this species is the shape of the two bracts that enclose the nut. They are so united as to form a tubular beak about an inch and a half long with the nut at the bottom. In shape this beak has been compared to a long-necked bottle. The tube is fringed at the end, and the outside is covered with short stiff hairs. These spicula were once employed by a physician of Bethlehem, Pennsylvania, who found them efficacious in expelling worms. The nuts are sweet and pleasant, and in every way are almost exactly like those of the American Hazelnut.

When boys and girls go nutting in the autumn, the lowly bushes of this species by the roadside are apt to be overlooked; but the nuts are well worth gathering. They are not bulky, are easily cracked, and there is but little waste. The Indians frequently let the chipmunks and squirrels gather the nuts for them, searching in likely hollow trees and logs where they might have been stored for the winter, but one must first make sure the animal is not at home to avoid a nasty bite. The inner skin of the nut can easily be removed by spreading the shelled kernels on a baking pan and heating them in the oven at 325° F for half an hour. When they are cool, the skin can be rubbed off with a towel.

The Ironwoods or Hornbeams

Two genera of small trees, Carpinus and Ostrya, in the same family as the birches, are frequently met in the woods, often modestly hidden under the larger trees. In the Catskills they are represented by one species each. The hornbeams grow rather slowly and their wood is close-grained, heavy, and hard. In flexibility, strength, and ability to stand strain, they rival steel. Before metals so generally became competitors of wood in construction work, hornbeam was locally the only wood for rake teeth, levers, mallets, and especially for the beams of ox yokes. It outwore the stoutest oak, the toughest elm. Springiness well adapted it for fork handles and the like. Bowls and dishes of hornbeam lasted forever and would never leak nor crack. "Ironwood" was the name used wherever this wood was worked.

Many writers feel that it is unfortunate that Carpinus has acquired the names Blue Beech and Water Beech when in fact it is not a beech but belongs in the birch family. This is not the first instance in which a common name is somewhat misleading, but it must be admitted that the smooth, dark bluish-gray bark of this species is definitely reminiscent of the bark of the American Beech. On the other side of the coin is the preference of some writers to call this species American Hornbeam and to designate the closely related Ostrya as Hop-hornbeam, which many people find confusing. Further to confound the issue, both Carpinus and Ostrya are called Ironwood, which is even more confusing. The wood of Ostrya, however, is denser than that of Carpinus, so the writer feels that "Ironwood" should be reserved for the former species and our Carpinus should be called Blue Beech to avoid the confusion of having two hornbeams.

Carpinus L. Blue Beech, Hornbeam.

This genus comprises some 25 species that grow in temperate parts of the northern hemisphere but in North America extend south into Central America. They are trees or tall shrubs with close gray bark, in this and in the slender buds and straight-veined leaves resembling the beech. The name of the genus is the ancient name of the European C. betulus.

The European Hornbeam, C. intermedia, is chiefly used as firewood, igniting quickly and producing a bright clear flame; it also makes excellent charcoal as well as being employed for the handles of tools, wooden screws, the teeth of cogwheels, and other small articles. The dried leaves of C. betulus were once valued and largely consumed in central Europe as forage for domestic animals; and a cinnamon or "light nankin" dye has been obtained from the fresh wood of this species, barked. The ability of this tree to support frequent and severe pruning makes it valuable as a hedge plant. The astringent bark of some species has been used in Europe for tanning leather.

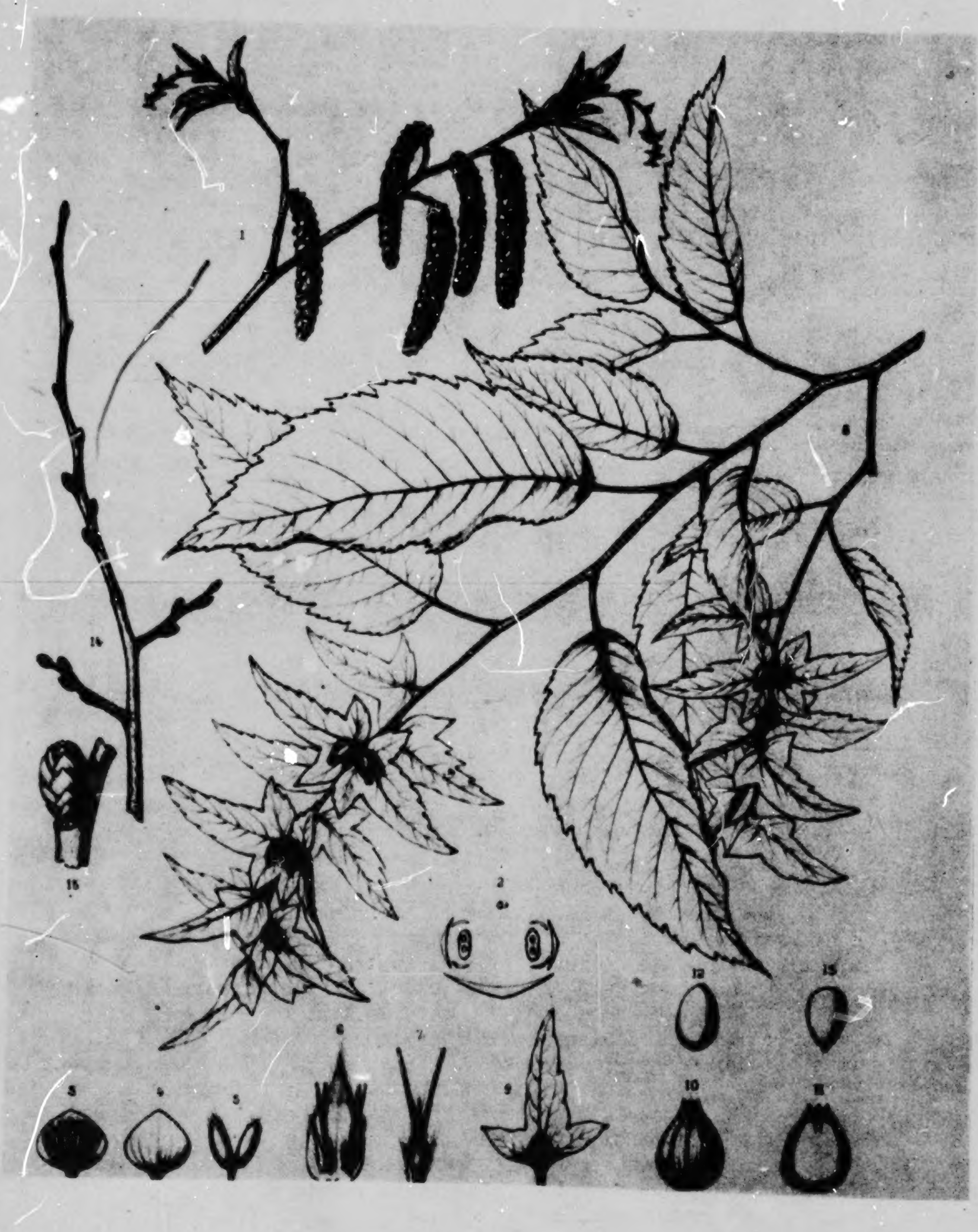
Hornbeams grow fairly quickly when planted in well-cultivated soil but otherwise develop slowly. The European Hornbeam, C. betulus, some of its varieties, and the Japanese, Chinese, and American hornbeams are interesting trees for large lawns and for the fringes of woodlands. They will grow in any soil but do best in an open sunny position in deep moist loam.

Carpinus caroliniana Walt. Blue Beech.

Meaning of Species Name. Of Carolina.
Other Names. American Hornbeam, Water-beech, Ironwood, Hornbeam, Smooth-barked Ironwood.
Type of Plant. A small tree or shrub with a maximum height of 40 ft and a trunk diameter of 2 1/2 ft, but usually only 10-30 ft tall with a trunk diameter of 8-12 in.
Habitat. Rich woods, swamps, and along streams.
Range. NS to Minn, s to Fla and Tex.
Distr in NYS. Frequent or common across the state outside the higher Adirondacks but largely absent from the coastal plain of LI.
Distr in the Torrey Range. Common throughout the range except in the pine barrens of NJ and the coastal plain of LI, there rare or wanting.
Elevation. Has been collected at 2900 ft in Delaware co.
Time of Fl. Apr-May, fr Aug-Sep; fl Apr 25-May 15 at Cornell.
Origin. Native.
Remarks. Wood very hard and strong, durable, light brown; wt 45 lb per cu ft, dry wt.

At all seasons the Blue Beech can be identified by its typically short, contorted, and vertically fluted, muscular-appearing trunks with smooth, dark bluish-gray bark. It is of slow growth and is supposed to live to a great age. It is most abundant and grows to its largest size on the western slopes of the southern Allegheny mountains and in southern Arkansas and eastern Texas. The name "hornbeam" has reference to the extreme hardness of the wood--"horn" for toughness, and "beam," an old word for tree, comparable with the German Baum. "The Horne Bound Tree," wrote William Wood in New England's Prospects, "is a tough kinde of Wood that requires much paines in riving as is almost incredible, being the best to make bolles and dishes, not subject to cracke or leake." Late in April or early May its slim catkins and dainty leaves appear together. In summer its foliage is like that of the beech--the blades themselves thin and beautifully translucent but the foliage in the mass dense, giving a shade cool yet not dark. In late autumn the leaves turn deep scarlet and orange.

The wood is white, heavy, hard, tough, strong, and durable, but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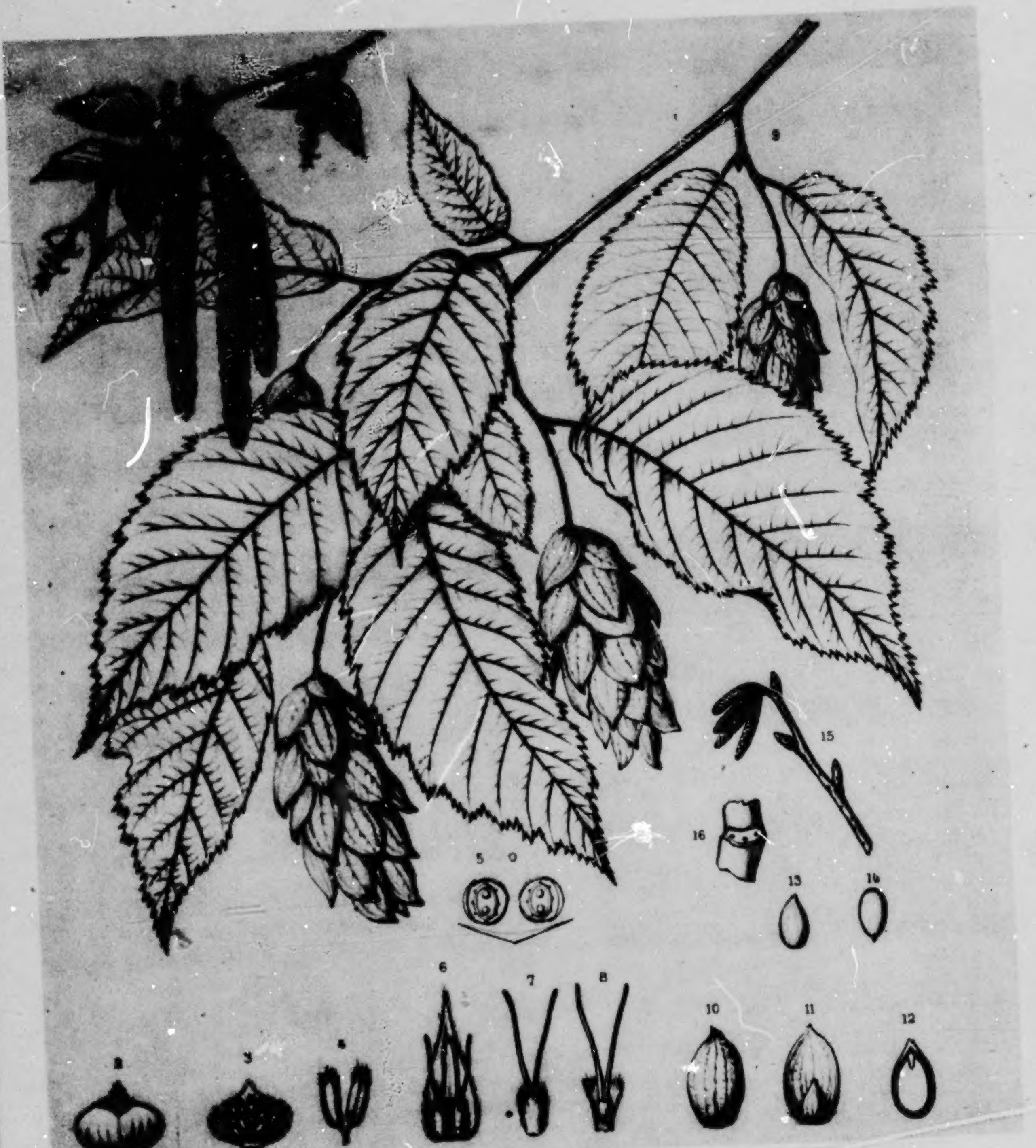
Carpinus caroliniana--Blue Beech
[From Sargent (1891-1902), Vol. IX, Plate 447, p. 42.]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Ostrya virginiana--Ironwood
[From Sargent (1891-1902), Vol. IX, Plate 445, p. 34.]

surprisingly, it decays rapidly on contact with the ground. Owing to the small size usually attained by this tree, the wood is of very little commercial value, but it is often used for levers, home-made tool handles, and for fuel. Charcoal made from this species was formerly used in the manufacture of gunpowder. Kephart states that the nutlets are edible, but, in the words of Steyermark (1963), "considering their small size, a considerable number would have to be gathered to be of much food value," so they are likely to be used only in cases of emergency. This tree is only of secondary importance to wildlife, but its nutlets are eaten by many birds, including the ruffed grouse, wood duck, bobwhite, pheasant, and wild turkey, as well as by gray squirrels and chipmunks; the buds are often eaten to a limited extent by several kinds of birds, including ruffed grouse and bobwhite; and the cottontail rabbit and white-tailed deer eat the twigs and shoots.

The graceful habit of the Blue Beech, its smooth and beautifully fluted stem, its dark blue-green foliage, and the splendor of its autumnal tints of crimson, scarlet, and orange, make it a desirable ornament for the parks and gardens of eastern North America, being particularly valuable for planting on wet sites, although it does equally well in drier situations. Because of its small size, most lumbermen usually think of this species as a mere weed tree and some have urged that it be destroyed to make room for more important species. "But in the judgment of more mature authorities," states Peattie (1950), "it is seldom wise practice, in the management of the mixed deciduous woodland, to try to grow just a few species of the highest economic value. Forest trees do best in a forest and under the most natural conditions. By that standard, Blue Beech is of value as a companion tree and a contributor to the total biota."

Óstrya Scop. Ironwood, Hop-hornbeam.

This is a genus of seven species of the north temperate zone. They are slender trees with very hard wood, brownish or grayish furrowed bark, and foliage resembling that of the birches. The flowers appear with the leaves; the staminate aments grow from scaly buds at the tips of the branches of the preceding year, while the single pistillate flowers terminate short leafy shoots of the season. The name of the genus is derived from the Greek name for a tree with very hard wood. Only one species occurs in the northeastern states and adjacent Canada, but two others grow in the southwestern states. Related European trees were originally used in making ox yokes and were known as Yoke-elms or Hornbeams.

Óstrya virginiana (Mill.) K. Koch. Ironwood.

Meaning of Species Name. Virginian.

Other Names. American Hop-hornbeam, Eastern Hop-hornbeam, Hop-hornbeam, Leverwood, Deerwood, Hardhack, Indian Cedar, Black Hazel, Rough-barked Ironwood, Eastern Ironwood.

Type of Plant. A small tree or shrub with a maximum height of 50 ft and a trunk 2 ft in diameter, but usually only 20-30 ft tall with a trunk 1 ft or less in diameter.

Habitat. Rich woods and banks and along streams and shores.

Range. NS to Man, s to Ga, Tenn, Mo, Okla, and Tex.

Distr in NYS. Common throughout most secs of the state; rare in the higher Adirondacks as well as on LI and SI.

Distr in the Torrey Range. NY: N of the moraine on LI, thence increasing and common northw.

Elevation. Sea level-2900 ft in the Torrey range.

Time of Fl. Apr-May, fr Jul-Aug; fl Apr 25-May 15 at Cornell.

Origin. Native.

Remarks. Wood 51 lb per cu ft, dry wt.

Ironwood is scattered throughout the hardwood forests of the northeastern states, commonly occurring as a small understory tree. The larger trees can be identified at all seasons by the dull grayish-brown bark which breaks into small, more or less rectangular scales, loose at the ends, giving the trunk a shreddy appearance. This tree owes one of its common names to the unique clusters of fruit that hang from its branches in summer and autumn and resemble those of the Hop-vine; it is a handsome shapely tree, with its beautiful scaly bark, its yellow-green leaves, and its broad head of slender lustrous pendulous branches presenting broad flat surfaces of foliage, which form in the sunshine effective masses of light and shadow. It is well worthy of a place in the parks and roadside plantings of eastern America.

Except for the Flowering Dogwood, this is the hardest wood in our northeastern silva; it is strong, compact, and remarkably durable, hence the tree's common name of Ironwood. This is a small tree and not abundant enough to be commercially profitable, but it is locally useful for fence posts, mallets, levers, wedges, tool handles, sled runners, and other small articles, and it was once used for cogwheels and binding poles for heavy loads, as well as for firewood, but its wood is hard to work. The bark, although rich in tannin, is little used.

In addition to using the wood of this species to make frames for dwellings and other utilitarian purposes, Densmore (1928) states that the Chippewas also made medicinal use of Ironwood. The wood, combined with leaves of *Thuja occidentalis*, was "used with other ingredients in making a cough sirup" that was taken internally. To treat hemorrhages from the lungs they steeped together the heartwood of *Ostrya*, the root of *Corylus* (species not designated), the root of *Quercus alba*, and the inner bark of *Prunus virginiana* to make a decoction to be taken internally. Wood "at the 'heart of the branches' was cut in small bits and boiled, making a decoction" used in the treatment of kidney trouble. Chips cut from the "heart" of the wood of *Ostrya* were combined with *Lycopodium obscurum* and twigs of *Picea glauca* to make a decoction used for steaming stiff joints in the treatment of rheumatism.

Early settlers also made medicinal use of this species. A decoction of the heartwood of this tree was long used by the laity as an antiperiodic in intermittent fever and as a tonic and alterative in scrofulous conditions and dyspepsia. A. and C. Krochmal (1973) report that a fluid extract of the inner bark was used in colonial times in the treatment of malaria and that both the outer and inner bark have been used as a laxative and to treat indigestion and fever, while a poultice of the bark was used to reduce swellings of the neck. Sargent (1891-1902) reports that "In handling a branch of *Ostrya* in summer and autumn the stiff sharp-pointed one-celled hairs which surround the base of the fruiting involucre become detached and, sticking into the flesh, produce in some people an acute inflammation which does not entirely disappear for several hours."

Like the Blue Beech, this species has rather limited value as food for wildlife, but during the fall and winter months the nutlets are frequently eaten by ruffed grouse, pheasant, and bobwhite, as well as by several kinds of songbirds; rabbits, gray squirrels, and fox squirrels likewise consume its seeds. The buds and catkins are eaten by some game birds, squirrels, and white-footed mice; cottontail rabbits sometimes gnaw the bark and twigs; and it is occasionally browsed by the white-tailed deer.

FAGÀCEAE, the Beech Family

This family contains six genera and more than 500 species, mostly of temperate and subtropical regions of the northern hemisphere. Besides the following three genera of the Catskills, the family includes *Nothofagus*, antarctic beeches resembling *Fagus*, with some 14 species restricted to the southern hemisphere; *Pasania*, resembling *Quercus*, with at least 100 species, chiefly pantropical: and *Lithocarpus*, a genus of about 100 species, mostly in southeastern Asia. Most available evidence supports the view that the Fagaceae and Betulaceae are more closely related to one another than to other amentiferous families, with the Betulaceae perhaps being the more primitive.

Economically the family is of importance for the valuable lumber produced by its members, particularly species of oak, beech, and chestnut. Tannic acid is extracted from the insect galls of oak species, and commercial cork is obtained from the bark of *Quercus suber*; in addition, species of beech, chestnut, and oak are cultivated for their edible fruits, and more than 65 species of oak are cultivated for ornament in the United States.

Key to Local Genera of Fagaceae

1. Staminate flowers in a small head on a drooping peduncle; nuts sharply triangular; bark of trunk smooth and light iron-gray, even in age.. *Fagus*
1. Staminate flowers in slender drooping catkins; nuts not triangular; bark in age rough, scaling, or cracking, 2
    2. Pistillate flowers 2-4 in each involucre; nut wholly enclosed in a hard prickly bur.................................. *Castanea*
    2. Pistillate flower solitary; nut (acorn) enclosed at base only, the bur not prickly.................................. *Quercus*

Castànea Mill. Chestnut.

This genus comprises about 10 species of trees or shrubs, natives of the milder temperate regions of the northern hemisphere somewhat away from the seacoast. There is ample geologic evidence that the genus was once much more widely distributed than at present, existing in northern Greenland and Alaska, western North America, and in Europe during the Middle Tertiary, the Upper Miocene, and the Cretaceous periods. The name of the genus is the ancient Latin name, from the Greek *castana*, chestnut. They are deciduous, catkin-bearing trees of much value for many purposes. They not only produce food for man and many forms of animal life, but also tannin for the leather industry, lumber, and firewood of certain value. The wood is outstanding in its resistance to decay. In Italy it is often found in churches known to be more than six centuries old.

Although its wood is brittle, coarse-grained, and porous, the largest growers furnish excellent timber, much used for telephone poles, fence rails and posts, railroad ties, mine props, building material, and to some extent material for interior finishing, despite the coarse grain that does not take a high polish. Although not so durable as oak, in southern Europe the native chestnut is largely used for building, furniture, and in cooperage. All species have remarkable capacity for self-replacement; that is, coppice growth springs up quickly when tops die or when trees are cut. Michaux reports that in France chestnut copses were once considered as a most valuable type of property; from such groves were cut hoops, vine props, hop poles, barrel staves, posts, and light timber. In the early 1800's they produced an annual income of from $16 to $24 an acre from land which would ordinarily not have brought in more than $4 per acre.

In addition to the once-plentiful American Chestnut, *C. dentata*, three other species are of considerable economic importance--the European or Spanish Chestnut, *C. sativa*; the Japanese Chestnut, *C. crenata*; and the Chinese Chestnut, *C. mollissima*. The European Chestnut is first in economic importance as its indigenous range includes much of southern Europe, northern Africa, and southern Asia east of the Caucasus; in addition, it has long been grown successfully in England, Scotland, India, and Australia. This species is probably the most massive grower of the genus and is the principal source of chestnuts consumed in Europe and the United States; over 16,000,000 pounds have been imported annually from Italy, Portugal, Spain, and France.

It is as a source of food that the chestnut is most highly valued. In Europe, north Africa, and Asia it has from earliest times been an important source of rich, nourishing nuts, especially in southern Europe, where, among the common people, chestnut bread serves as a substitute for potatoes and wheat. The nuts are gathered as they fall and placed in deep trays under the roofs of small huts, in which slow fires of green wood are kept burning until the nuts become dry and hard. They are often cooked with stewed meats or, in the form of flour, made into a thick porridge. The French often boil chestnuts with the leaves of celery, sage, or other savory herbs, which are then mashed and eaten like mashed potatoes, and fritters made from chestnut flour are considered a great delicacy. The French *marrons glaces* are boiled chestnuts dipped in clarified sugar and then dried. Chestnuts of the smallest sizes are used as food for livestock and wildlife.

Trees of both American and European species were largely killed throughout the entire eastern United States during the period 1900-1935 by the chestnut blight, which was inadvertently introduced into the country from the orient at the beginning of the century. Strenuous efforts at control were made but with no practical success.

The Japanese chestnut is indigenous to Japan and Korea. It is a small tree or large shrub, very productive and blight resistant. *C.*

mollissima, the Chinese Chestnut, grows to 60 feet high and is promising as a source of blight-resistant verieties of high quality. This species was introduced into the United States as early as 1855, but distribution of seed on a large scale did not begin until the United States Department of Agriculture became active in this field in 1906. Since that time it has been planted in many areas. As a rule the nuts are not so large as those of the European Chestnut, but they are attractive in appearance and very sweet. *C. pumila*, the Chinquapin, a native American shrub or small tree that is apparently immune to blight, produces small nuts with sweet meats.

The meal of the chestnut has been used for whitening cloth and for making starch. The nuts contain about 15 percent sugar and by expression yield a thick syrup from which in turn a very usable sugar can be derived. In some places chestnut leaves have been used as a popular remedy in fever and ague because of their tonic and astringent properties, but their chief reputation rested upon their efficacy in relieving paroxysmal and convulsive coughs, such as whooping cough, and other irritations of the respiratory system. The leaves were picked in June and July, when in the best condition, and dried. An infusion of 1 ounce of the dried leaves in a pint of boiling water was administered in tablespoonful to wineglassful doses, three or four times daily.

Castànea dentàta (Marsh.) Borkh. American Chestnut.

Meaning of Species Name. Toothed, from the leaves.
Other Names. Sardin Nut, Prickly Bur.
Type of Plant. A large tree reaching a maximum height of 100 ft and a trunk diameter of 14 ft.
Habitat. Dry, gravelly, or rocky, mostly acid, upland soils.
Range. Originally from Me to Ont, Mich, and Minn, s to Del, Ky, Ill, and along the mts to Ga and Ala.
Distr in NYS. Formerly frequent or common across the state s of the Adirondack reg, but rare or lacking in the pine barrens of LI.
Distr in the Torrey Range. Formerly throughout the range except in s NJ and the pine barrens, there rare and local or wanting.
Time of Fl. Jun-early Aug, fr Sep-Oct; fl Jul 5-20 at Cornell.
Elevation. Has been observed at 3000 ft in Delaware co.
Origin. Native.
Remarks. Wood coarse-grained, durable, brown; wt 28 lb per cu ft.

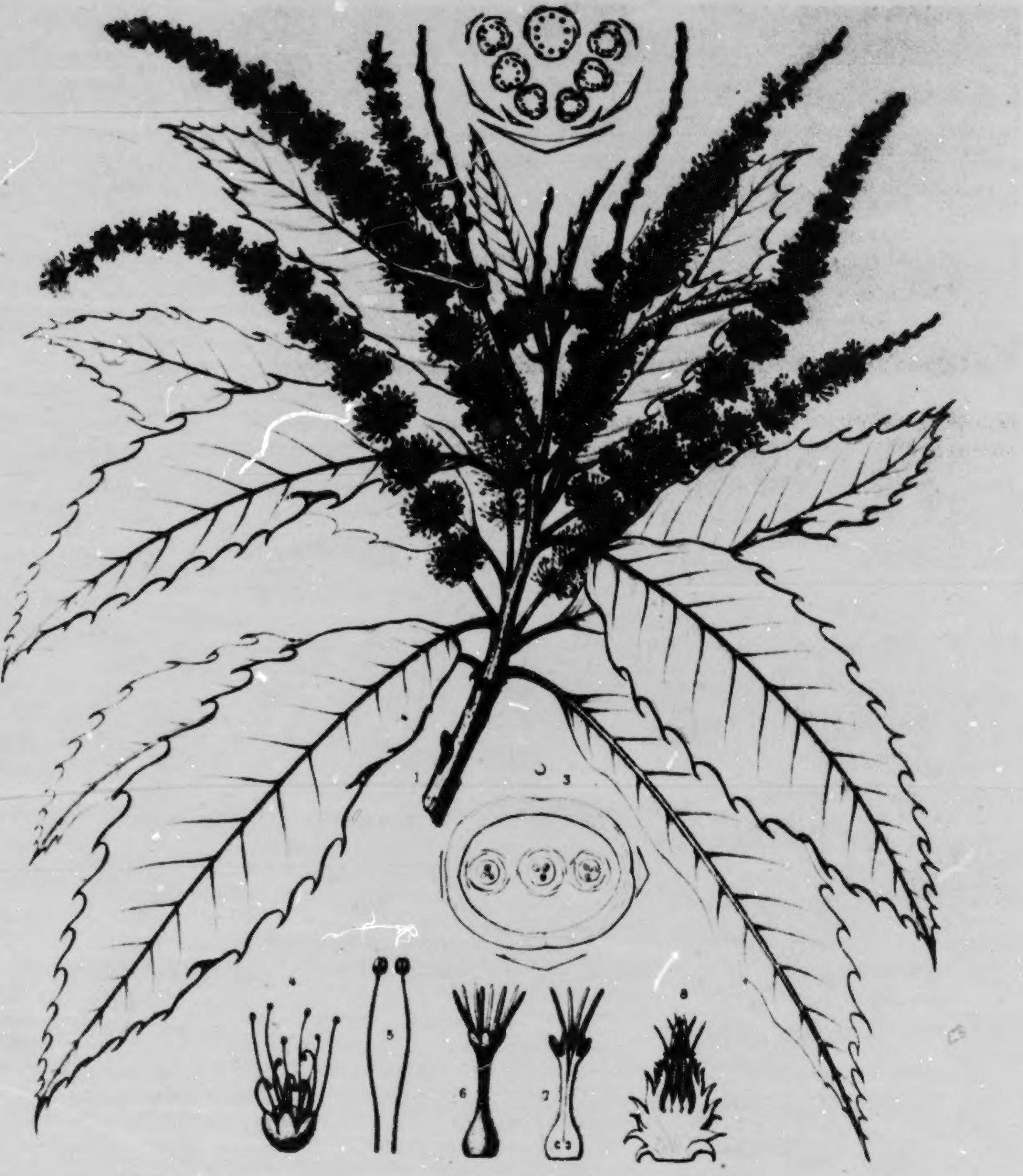
The American Chestnut has alternate, oblong-lanceolate, coarsely toothed leaves, three or four times as long as wide, tapered at both ends. The pencil-like catkins of the staminate flowers, borne in late June or early July, are straw-colored and from 6 inches to nearly a foot in length, with the pistillate flowers at their bases. The bur formed by the developing fertile flowers, which contains from one to three nuts, grows from 2 to 3 inches in diameter and is armed with fierce spines.

This species was once one of our most valuable forest trees, dominant in dry forests throughout the northeastern states and one of the largest hardwood trees of the eastern forests. Today it is hardly more than a memory, for in the early 1900's it was struck by a blight caused by a fungus from eastern Asia, inadvertently introduced along the Atlantic seaboard. It was first recognized in the New York Zoological Park in 1904. From there it spread in all directions with sickening rapidity as the spores were disseminated far and wide by the wind. Large sums of money were spent in an effort to bring it under control, but to no avail, and in less than one generation the disease completely eliminated the American Chestnut as an important forest tree. Because of the remarkable vitality of this species, however, numerous sprouts still spring up from some of the old roots, often attaining a height of 20 feet or more. These sprouts often flower and produce fruits, only to succumb to the blight as soon as they attain moderate size, for the fungus continues to live in portions of the roots.

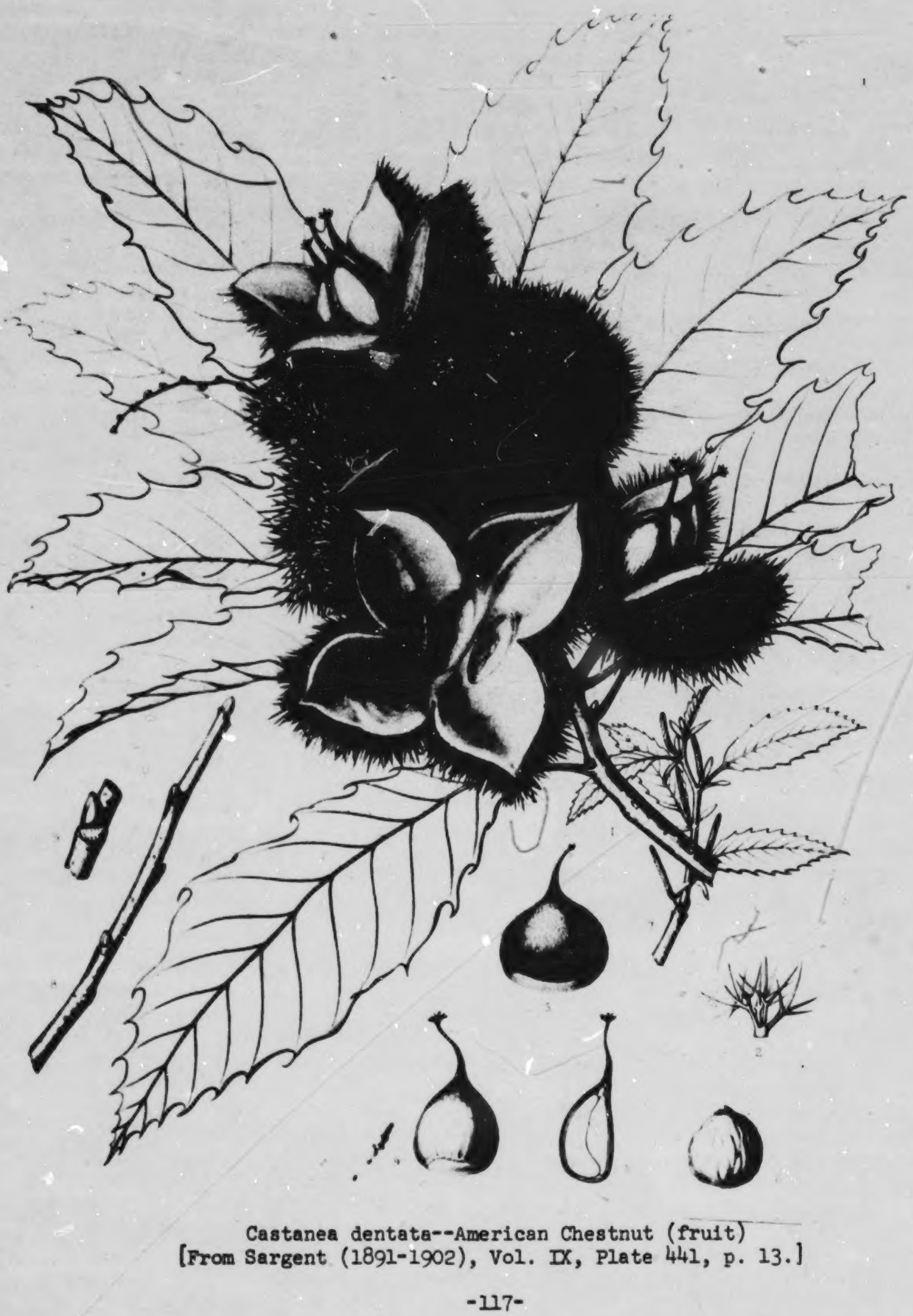
No forest tragedy has been more devastating, for not only was it an excellent shade and timber tree, but its bark was a rich source of tannin and in fall its sweet nuts provided a regular supply of food for man and forest wildlife. Its wood was reddish-brown in color, rather coarse in texture, strong, elastic, and only moderately light and hard, but it was remarkably resistant to decay either when exposed to the weather or in contact with the soil. It was often used for cheap furniture, musical instruments, interior finish, general construction, caskets, boxes, and crates, as well as for railroad ties, mine props, fence posts, poles, and rail fences. Steyermark (1963) states that "Many dead trees continue to supply a market for chestnut rail fence poles and posts." It was also much used, as a substitute for oak and pine, in buildings; beams, joists, and other parts of the frame made of it were almost imperishable. It was likewise used for shingles but was less valuable for this purpose because of its warping when exposed to heat. In the framework of furniture to be covered with veneers of mahogany or other ornamental wood, it was considered better than any other native wood, and the frames of bureaus and sofas, and the bottoms and sides of drawers, were made of it. An extract of the wood was once used to correct the color of Hemlock and other tanning materials, as well as to produce a black dye and ink.

Unlike the beech and oak, whose blossoms are often killed by late freezes, the chestnut did not bloom until late in the season when danger of frost was past, so it always matured a crop of nuts every year; they were smaller than the old-world chestnuts but they surpassed them in sweetness and flavor. Not only were large quantities of the nuts gathered for home use, but bushels were shipped to city markets in the east and there was still an abundant supply for bears, deer, squirrels, bobwhite, wild turkeys, and other forest birds and mammals. It was also a very important food of the American Indians, for it served in many preparations unknown to modern Americans, who today use the European chestnut chiefly as a relish or in stuffings to accompany the roast turkey of a holiday meal.

The American Chestnut is the only plant reported to have been used by an Indian tribe as a remedy for whooping cough. It appears that the Mohegans learned from the whites to use a tea of the leaves to treat this infectious disease. The Indians also used this tea to promote expectoration, and it was similarly used by the pioneers. In addition, John Brickell reported in 1737 that "the Leaves or Bark of the Tree boiled in Wine are good against the Bloody Flux, and all other kind of Fluxes." Although Millspaugh (1887) wrote that chestnut leaves were used in the treatment of whooping cough, largely because it was then thought that they effected a "sedative action upon the nerves of respiration," the U.S. Dispensatory of 1942, as reported by Weiner



Castanea dentata--American Chestnut (flowers)
[From Sargent (1891-1902), Vol. IX, Plate 440, p. 13.]



Castanea dentata--American Chestnut (fruit)
[From Sargent (1891-1902), Vol. IX, Plate 441, p. 13.]

(1972), called this belief a superstition, adding "there is ... no sufficient reason to believe them to possess any therapeutic value except that of a mild astringent." The leaves, gathered in early fall, were official in the U.S. Pharmacopeia, 1873-1905, and in the National Formulary, 1916-47.

Fagus L. Beech.

There are 10 species of Fagus, all deciduous trees of the northern hemisphere with a close, smooth ash-gray bark and oblong-ovate, serrate, straight-veined leaves. The flowers appear with the leaves. The name of the genus is the classical Latin name of the European beech, derived from the Greek phagein, to eat, in allusion to the edible quality of the nuts. The common name of the beech tree, found in varying forms throughout the Teutonic dialects, means, with a difference of gender, either a book or a beech tree, the Runic tablets, or early books, having been made from thin slabs of this wood. Beeches are not such long-lived trees as oaks and elms; after the age of 120 to 130 years the wood often shows signs of decay, and, once it becomes marked with black streaks, decay progresses fairly rapidly, but such trees will live for many years, even though the trunk may be partially decayed.

In wood-hungry Europe where for the past two or three centuries only four or five species of trees were readily available to supply the needs of the population, the European Beech, F. sylvatica, growing from Norway and Sweden to the Mediterranean region, almost from time immemorial played a large role in human life. A large and fast-growing tree, the beech has been cultivated in Europe for more than three centuries, at first for the food which its sweet oily nuts afforded to deer and swine, and then as a timber tree. Since it can endure a great amount of shade, it has been found a valuable tree to plant under oaks and pines in the forest. The nuts seem to have been a food of New Stone Age man, just as they still are in many parts of central Europe, and even the dried leaves supplied forage for their cattle in winter. In Norway and Sweden, sawdust of the beech was boiled in water, baked, and mixed with flour to form material for bread in times of scarcity. In France the nuts were sometimes roasted and used as a substitute for coffee. The wood supplied the principal fuel, both for domestic heating and for charcoal used in making gunpowder and for smelting iron ore. In Italy the bark has been used for tanning leather.

It was one of the general utility hardwoods of Europe. The wood is hard, close-grained, and moderately heavy although not durable; being brittle and short-grained, it is not well suited for purposes where strength and durability are required. In Europe its chief uses were for panels of carriages, keels of boats, carpenters' planes, stonemasons' mallets, wooden bowls, tool handles, granary shovels, bootlasts, for chair-making, and small articles in turnery as well as for wooden shoes, which in some of the mountainous districts of central and southern Europe were once made almost exclusively from this wood. When available, it was also used very extensively for parquet flooring, wood pavement, and bentwood furniture. Impregnated with preservatives against attack, it has also been used for railway ties. Tar obtained by distillation from the wood was valued in the manufacture of creosote and has been used in the treatment of pulmonary diseases.

In Great Britain beechnuts seem never to have been much appreciated as human food, being considered valuable only for fattening swine, deer, and pigeons. In France, however, the preparation of beechnut oil for table use was so important that in some districts more than 2,000,000 bushels of nuts were gathered in one season. The ripe fruit was shaken down from the trees upon cloths spread to receive it, then sorted; the best nuts were selected, slightly dried, and crushed to break the shells, which were removed from the mass by fanning; the kernels were then ground in a mill to form a paste which was mixed with water, placed in bags, and subjected to pressure to extract the oil. This oil was stored in unglazed earthen vessels in a cool cellar for two or three months, after which it was drawn off into fresh vessels, leaving a residue at the bottom of the first jars. The cake left when the oil had been pressed out was sometimes made into coarse bread but it more often served as a cattle food. About 1 gallon of oil can be obtained from a bushel of nuts, and as much as 22 gallons have been obtained from a single tree. This oil, said to be equal in delicacy to olive oil, was used as a salad oil, as a substitute for butter, to adulterate olive oil, for making soap, and for illuminating purposes.

The nuts of beech, in Great Britain called mast or beechmast, were at one time known in England as buck; the county Buckingham was so named because of its famous beech forests. Beechmast has been used in Europe as food in times of distress and famine, but it ordinarily served as an abundant supply of food for game animals and swine, which were turned into beech forests to forage on the fallen fruits. In France the nuts are used for feeding pheasants and fattening domestic poultry, especially turkeys. During World War I an attempt was made in Germany to use beech leaves as a substitute for tobacco and a mixture was made up for the army, but it proved a failure. The tar, however, has been used medicinally as a stimulant and antiseptic; it was used internally as a stimulating expectorant in chronic bronchitis, or externally as an application in various skin diseases.

The leaves were formerly used in Great Britain, and are used to this day in some parts of Europe, for filling mattresses. Evelyn reported that "its very leaves, which make a natural and most agreeable canopy all the summer, being gathered about the fall, and somewhat before they are much frost-bitten, afford the best and easiest mattresses in the world, to lay under our quilts, instead of straw; because, besides their tenderness and loose lying together, they continue sweet for seven or eight years long; before which time straw becomes musty and hard ..."

Several well-known varieties of F. sylvatica are important decorative plants. These include the graceful Weeping Beech, the Bronze or Copper Beech, and the Cutleaf Beech, often called the Fernleaf Beech, featuring sharp, deeply lobed leaves. This variety is inclined to produce branches with typical leaves, however, which, if not soon removed, will outgrow the other branches.

Fagus grandifolia Ehrh. American Beech.

Meaning of Species Name. Large-leaved.
Other Names. Red Beech, White Beech.
Type of Plant. A large tree with a maximum height of 120 ft and a

trunk diameter of 4 1/2 ft but usually only 60-70 ft tall with a trunk 2-3 ft in diameter.

Habitat. Rich uplands, rarely in swamps.

Range. NS and NB to Minn, s to Va, in the mts to NC, Ky, and w to Ill and Mo.

Distr in NYS. Common throughout the state but scarce in the pine barrens of LI.

Distr in the Torrey Range. Throughout the range, always increasing northw and decreasing in size and number in the pine barrens; wanting in the middle of them.

Elevation. Has been observed at 3000 ft in Delaware co.

Time of Fl. Apr-May, fr Sep-Oct; fl May 10-Jun 1 at Cornell.

Origin. Native.

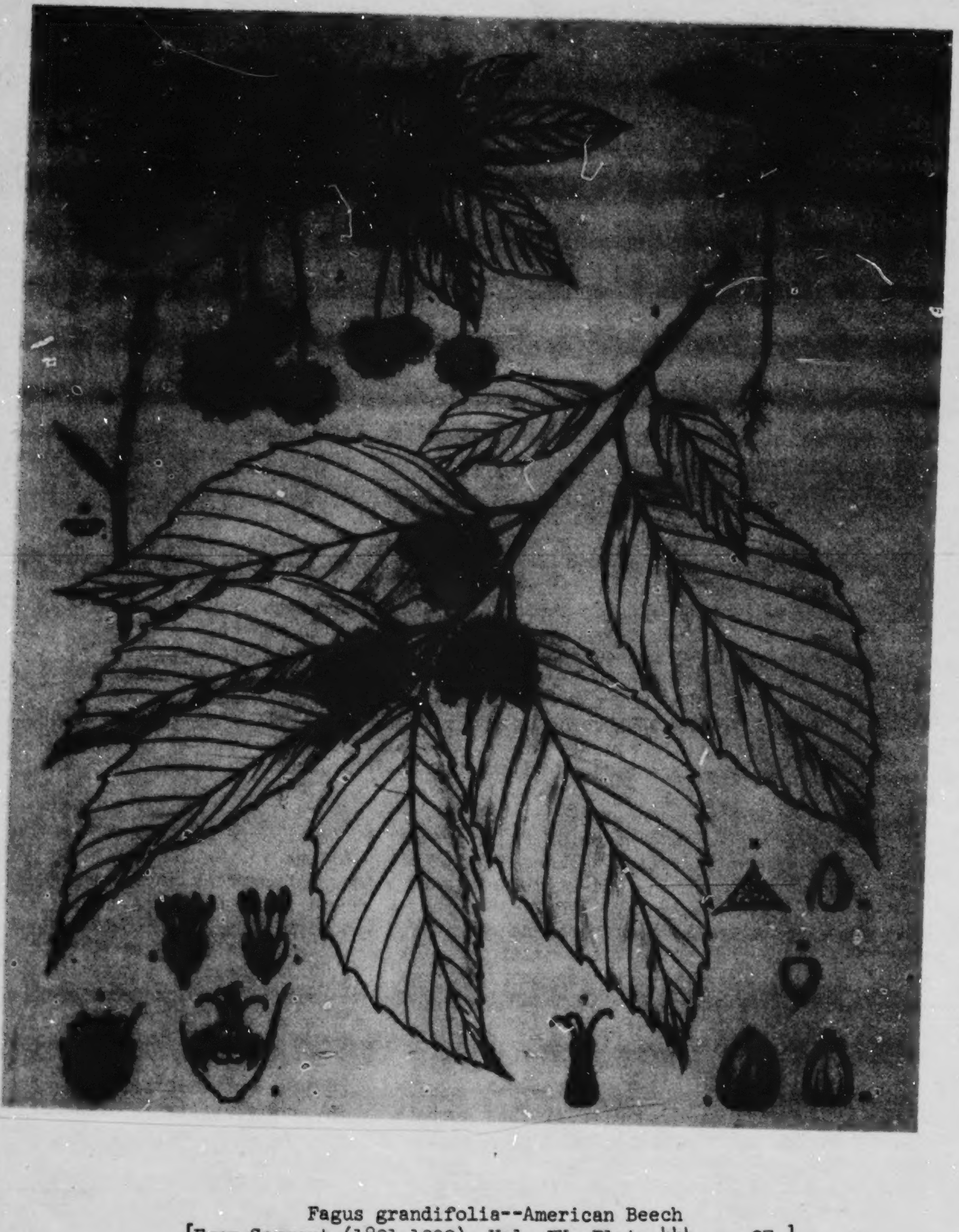
Remarks. Wood hard, strong, tough, close-grained, light or dark red; wt 43 lb per cu ft.

The American Beech, the sole representative of its genus in the western hemisphere, is a tall tree with distinctive smooth gray bark, often more or less blotched with darker mottling, and elliptic coarse-toothed leaves. It attains its greatest size in the lower Ohio valley and on the slopes of the southern Alleghenies. Standing alone, with room for full development, the beech is a fine, symmetrical tree with numerous wide-spreading branches thickly set with slender, flexible twigs. Several oaks have similar leaves, but oak buds and leaves are clustered at the ends of the twigs.

In spring, when the new leaves are about half-grown, fairly conspicuous ball-shaped, yellowish-green clusters of staminate flowers hang from the branchlets on threadlike stalks, but they are rarely seen because they fade so soon. The pistillate flowers, borne on the same tree, are not so easily seen. Later in the season the forming nuts, with their prickly burs about an inch long, are more and more in evidence in the leaf angles near the ends of the new shoots. The burs turn brown in autumn and with the first frost they open, dividing into four valves exposing the two brown, sweet, and nutritious nuts, three-angled, like a grain of Buckwheat.

Beech, together with Yellow Birch and Sugar Maple, forms the so-called northern beech-birch-maple forest that covers wide areas in the northeastern and lake states. Like Sugar Maple, the American Beech can grow under heavier forest cover than other associated hardwoods. It has a shallow root system and often sends up suckers from the roots. Large trees are often surrounded by a thicket of smaller ones, which seem to take advantage of newly cleared trails to develop more rapidly than those of other species, and a considerable portion of its natural reproduction is achieved in this manner. Because of its smooth gray bark, beech usually has great attraction for that species of forest park vandal, the initial carver, whose handiwork along trails scars otherwise attractive tree trunks.

Beech produces a wood which is close-grained, heavy, hard, strong, tough, and difficult to split. In Europe beech was one of the best hardwoods available and it was used for a multitude of purposes, but in America the early settlers found many other hardwood trees superior to the beech. In former years, therefore, it was not considered of much commercial value except for fuel, but now it is a much more important timber species even though the quality of its wood is only fair and it is difficult to season,



Fagus grandifolia--American Beech
[From Sargent (1891-1902), Vol. IX, Plate 444, p. 27.]

being inclined to check badly in drying. It is commonly utilized for flooring, furniture, tool handles, veneer, shoe lasts, bowls, trays, and various other articles of woodenware such as clothespins, picnic plates, and spoons. At the present time, however, such articles are more commonly made of plastic or paper. Since it has almost no perceptible taste or odor, it was often used to make barrels, boxes, and other containers for food. The older the trees, the greater the amount of red heartwood in proportion to the white sapwood next to the bark, so red and white beech wood are distinguished by lumbermen. Red beech makes superior floors, tool handles, and chairs. Woodsmen rate it as one of the very best fuel woods, ranking it next to maple and hickory, for it burns with a clean, hot flame and leaves a bed of long-lasting, glowing coals. The wood is also destructively distilled for charcoal, wood alcohol, and acetate of lime. In 1940 the cut in the United States amounted to 164,740,000 board feet.

American Beech makes a fine shade tree, but it is not often planted for this purpose, mainly because it grows so slowly, for beeches are long-lived and have been known to attain an age of 300 to 400 years. Another objection is the fact that it produces suckers from its shallow root system, so in the northeastern states, at least, the European species are more often planted for ornament than is our native tree.

The nuts are important as food for many small animals, including mice, squirrels, and chipmunks as well as black bear, raccoon, red and gray foxes, white-tailed deer, cottontail rabbit, porcupine, and opossum, in addition to such birds as ruffed grouse, wild turkey, bobwhite, and pheasant. While deer browse on the sucker shoots, it is not one of their preferred foods. But over most of its range the American Beech is unfortunately not dependable as an annual source of food for forest wildlife, since years often pass between good fruiting periods. Fruit is abundant, in general, only every third year on any one tree, and commonly a heavy or a light harvest of the nuts prevails over a whole region. Also, for some unknown reason, better crops and larger nuts are produced in the northern part of its range than elsewhere. When the crop of nuts is light, it works a noticeable hardship on wildlife.

Beechnuts, which contain up to 22 percent protein, were an important part of the Iroquois diet as well as that of other tribes in the eastern and north central states. The edible kernels were either eaten fresh or stored for use in times of scarcity. They also pressed an oil from them that would keep for a long time without becoming rancid; it was highly prized for cooking. The Indians of Maine even utilized the buds and the immature nuts for food. The Indians also sometimes used a decoction of the leaves in the treatment of frostbite. The Rappahannocks steeped a handful of bark from the north side of this tree in a pint of water to which a little salt was added; the wash was applied thrice daily to poison ivy sores.

Although not employed by the Indians as a substitute for coffee, roasted beechnuts were adapted for this purpose by the early settlers. The inner bark of the beech tree has been used in Europe, like pine, to make bread; if necessary, the American Beech could no doubt be similarly used. Porcher says that the young leaves are used by the common people of the south as a potherb, for the young unfolding leaves can be cooked as a vegetable. The nut, readily opened by the thumbnail, is one of the most delicious products of the northern forests, and although it is now rarely if ever seen in our markets, it is not many years since it was regularly brought in large quantities to the country grocery and even to the Boston market.

Oil pressed from the nuts of the European Beech has been used in a variety of ways; since our native beech is so similar, its fruit could very likely be used in the same way. The leaves of the European Beech were also used to stuff mattresses in preference to straw. It was natural that this custom should be brought to this country where, in the Ohio valley at least, the native beech was similarly used. The leaves are more springy than those from other trees and do not mat down so readily. The wood ashes contain appreciable amounts of potash and were once important in soapmaking. In addition, a "chamoy yellow" dye has been extracted from beech mast.

Quercus L. Oak.

This is a large group of evergreen and deciduous trees and shrubs widely distributed throughout the north temperate zone and South America, a group that includes some of the world's most important timber trees. The variation in many species and the existence of numerous hybrid forms make the determination of the exact number of species difficult, but it is estimated at from about 300 to 500 species. The name of the genus is the ancient Latin name of the oak. It is the largest genus of trees in the northeastern states, where it is represented in nearly all habitats. In North America the oaks attain their greatest size and economic importance in the southern part of the United States, especially in the lower Mississippi valley; they reach their maximum diversity in the highlands of Mexico, where they form vast forests. Some 84 species are found in the United States, 10 of which extend into southern Canada. Many of our native oaks are beautiful trees and therefore highly valued for ornamental planting as shade, park, and street trees. Oaks are deep-rooting and it usually is possible to grow a lawn beneath them without undue difficulty.

In outward appearance the various species of oak exhibit a great deal of difference, but they are readily distinguished from all other trees by their fruit, an acorn, which consists of a nut partially or wholly enclosed in a cup composed of numerous involucral scales. There is a certain likeness in the leaves of most of our northeastern oaks. They are simple, roughly oval in shape, and the margins are generally cut into lobes by deep or shallow bays. The twigs of oak trees are more or less distinctly 5-angled, and the winter buds cluster at the ends of the branches. Most of our American oaks fall roughly into two main groups--the white oaks and the red or black oaks. In the white oak group the acorns ripen at the end of the first season, the shell of the nut is smooth inside, and the leaves or their lobes (which are usually rounded) are without bristle tips. In the black or red oak group the acorns ripen at the end of the second season, the shell of the nut is hairy inside, and the leaves or their lobes (which are usually sharp-pointed) are bristle-tipped.

The flowers appear in early spring, just as the new leaves are emerging from their buds. Those that bear the stamens are strung along slender dangling threads borne in clusters that emerge from buds on the previous year's twigs. As the dry, powdery, wind-blown pollen is shaken into the air, it covers everything around with a fine, yellowish dust. To find the pistil-bearing flowers it is necessary to look more closely on new leafy shoots in the axils of some of the leaves. They do not look much like flowers, for each one is just a pistil surrounded by a 6-lobed calyx that is partly enclosed by a cluster of minute scales. When several kinds of closely related oaks are growing together, a good deal of natural hybridization may take place, particularly among young trees. This is an indication that the family is relatively plastic, compared with most others in which more rigid genetic barriers have been evolved to prevent intercrossing.

In ancient times, according to Homer and Hesiod, acorns were the common food of the Arcadians, but there is much reason to think that these authors were actually referring to the chestnut. In spite of this, however, there is little doubt that acorns have long been used as food both for man and beast. And records of Norway, France, Spain, Algeria, Syria, Arabia, Persia, and China attest to the wide geographical range over which use was made of acorns as food in the old world. In England, whose oak forests were one of the sources of national wealth and naval supremacy, the tree was once prized only for its acorns, which supplied a large amount of food for the large herds of swine whose flesh formed so considerable a part of the food of the Saxons. During the Anglo-Saxon rule in England, the "mast" of the oak forests was therefore regarded as one of the most valuable products of the forest, and the right of feeding hogs in the woods, called pannage, formed one of the most valuable kinds of property. With this right monasteries were endowed, and it often constituted part of the dowry of the daughters of Saxon kings. But in times of famine, the peasantry were also thankful for a share of this nourishing food.

Acorns also formed a very important portion of the food of the American Indians. From coast to coast they once ground them into meal--as in some places they still do--after first removing the bitter tannin, thus converting them into staple articles of diet. Although the sweet acorns of the white oaks have less tannin than the acorns of the red oaks, the latter were also used extensively by the Indians. One Indian tribe in Wisconsin roasted and ground acorns of the northern Pin Oak for use as a coffee substitute.

Acorn meal was not the only food product derived from the oak. In the Near East, the Turkish Oak, Q. cerris, is visited in August by immense numbers of a small, white coccus insect, from the punctures of which a saccharine fluid exudes and solidifies in little grains. The wandering tribes of Kurdistan collect this saccharine secretion by dipping the branches on which it forms into hot water and evaporating it to a syrupy consistency. In this state the syrup is used for sweetening food or it is mixed with flour to form a sort of cake.

Among European oaks, Q. robur, known in England as the English Oak, is a native of most of the milder parts of Europe and of the Caucasus mountains of Asia. It is one of the larger trees of the genus, though old specimens are often more remarkable for the great size of the trunk and main boughs than for their very lofty height. The wood of this species is one of the most valuable produced in temperate climates and was formerly in great demand for the construction of merchant shipping. The fine-grained heartwood is sought by the cabinet-maker for the manufacture of furniture, as also are the gnarled and knotted portions of slowly grown trees, which are made into veneers. Oak was also formerly largely used by woodcarvers. The cultivation of this oak in Europe forms one of the most important branches of forestry.

The Cork Oak, *Q. suber*, the thick bark of which yields cork, is a native of the west Mediterranean area and is extensively grown in Spain, Portugal, and north Africa. Although well known to the Greeks and Romans, who used it to float their nets and for various domestic purposes, cork did not become an important article of commerce until the 17th century when glass bottles came into general use. The systematic cultivation and care of forests of Cork Oak, with the regular harvesting of their crops of bark, was instituted in northeastern Spain in 1760. Cork is principally obtained from the natural forests, few artificial plantations having been established for this purpose. In Spain and Portugal the wood is also of some value, being hard and close-grained, and the inner bark is used for tanning.

In Europe the bark of native oaks was once universally used to tan leather, and for this purpose the bark was harvested in April and May. Oak sawdust was also used for tanning, but it is much inferior to the bark for that purpose. The valonia of commerce, one of the richest of tanning materials, is the acorn of *Q. macrolepis*, a fine species indigenous to Greece and the coasts of the Levant. In North America no attempts have been made to raise oaks for the sake of tanbark, but in Europe the production of oak bark from plantations created for the purpose is an important industry and has been practiced for centuries. It is usually gathered from saplings 20 to 30 years old. In harvesting the bark, the trees are cut, the plantations or coppice woods renewing themselves several times by the vigorous shoots that spring from the stumps. In Brittany, tan compressed into cakes was once used as a fuel. Some oaks are of indirect importance because of products formed by their insect enemies. Of these the Aleppo gall is yielded by *Q. infectoria*, a native of Asia Minor and western Asia, and *Q. coccifera* furnishes the kermes dye.

In Europe the Scottish Highlanders used an infusion of oak bark, with a small quantity of copperas, to dye woolens a purplish color, which, though not very bright, was said to be durable. Oak sawdust used to be the principal indigenous vegetable used in dyeing fustian in Great Britain, but it was possible to produce quite a wide range of other colors. In conjunction with salts of iron, oak bark yields a black dye; with alum, a brown dye; with a salt of tin, a yellow color; and with a salt of zinc, Isabella yellow. *Q. tinctoria*, a North American species, yields quercitron bark, still highly regarded for dyeing yellow. The American Indians are said to have dyed their skins red with the bark of *Q. prinus*, and *Q. velutina* was famous for the fast and bright yellows it imparted to textiles, but other native oaks were also utilized by 18th- and 19th-century dyers. Red Oak produced yellows, Chestnot Oak was used in reds, and White Oak produced a brown known as "Thee bou," a muddy tea color.

The astringent effects of the oak were well known to the Ancients, by whom different parts of the tree were much used in medicine, but it is the bark which is now employed. Its action is slightly tonic, strongly astringent, and antiseptic, and its qualities are extracted both by water and by alcohol. Like other astringents, it has been recommended as a good substitute for quinine in the treatment of intermittent fever, and it was considered very useful in chronic diarrhea, dysentery, and hemorrhages. A decoction was made from 1 ounce of bark in a quart of water, boiled down to a pint and taken in wineglassful doses. Externally this decoction was advantageously employed as a gargle in chronic sore throat, as an injection for leucorrhea, and it was applied locally to bleeding gums and piles. A remedial snuff was made from the freshly collected oak bark, dried, and reduced to a fine powder for use in the treatment of the early stages of consumption, as it was well known that tanners were practically exempt from this disease. Oak galls, caused by certain insects, were once extensively employed in tanning, dyeing, and in the manufacture of ink. Medicinally, however, they are the most powerful of all vegetable astringents. Oak bark from several species of native oaks was also widely used by many Indian tribes as an astringent and antiseptic. They likewise used oak bark in infusion for diarrhea and in washes for wounds and ulcers.

Twigs and fruits of oaks form a large portion of the food consumed by many game birds and mammals. Martin et al. (1951) were of the opinion that acorns, particularly, rate a position very near the top of the wildlife food list, not so much because they are a preferred food item but because they constitute an abundantly available staple, particularly in critical winter seasons when other foods are scarce. When the acorn crop is a failure, as sometimes happens, a number of wildlife species may be hard pressed for sustenance. Acorns of the white oak group seem to be more palatable to wildlife than those of the red or black oak group. In addition to their food value, oaks (especially young trees) also provide useful wildlife cover. A list of species in the northeastern states eating acorns includes many songbirds as well as some woodpeckers, the ruffed grouse, bobwhite, wild turkey, pheasant, mourning dove, wood duck, and blue jays. White-tailed deer, black bear, red fox, gray fox, raccoon, opossum, gray squirrel, fox squirrel, red squirrel, and chipmunks also eat the nuts. Deer, cottontail rabbits, and snowshoe hares browse the twigs, while porcupines eat the growing layer beneath the bark. Pigs, hardly less wild, can still be fattened on them. Extensive browsing on early spring foliage by cattle, however, occasionally results in poisoning.

In spite of the many other uses of oak products, however, it is for its lumber that oaks have been most prized, particularly that from the white oak group, many species of which are important timber trees. In the United States during the first half of the present century oaks provided about half the annual production of hardwood lumber. For hardness, strength, toughness, and durability united, it is unsurpassed, although each of these properties, singly, is found to a greater degree in some other wood. In earlier days, when ships were made of wood, it was the best ship timber known. It was also favored for the frames of buildings over all other timber and was considered almost indispensable in the manufacture of agricultural implements and all kinds of wagons as well as for tight cooperage. Today it is used primarily for flooring, interior finish, and furniture.

Key to Local Species of Quercus

1. Lobes or teeth of the leaves blunt, or sometimes acute, but not bristle-tipped; fruit maturing the first season; shell of the acorn glabrous on the inner surface (white oaks), 2

2. Leaves pinnately lobed, smooth, glabrous on the lower surface, distinctly petioled, with acute bases.................. *Q. alba*
2. Leaves coarsely and regularly sinuate-toothed (fruit sessile or nearly so; scales of cup not awned).............. *Q. prinus*

1. Leaves or their sharp lobes or teeth bristle-tipped; fruit maturing the second year; shell of acorn tomentose on the inner surface (red oaks), 3
    3. Leaves whitish or grayish on the lower surface, 4
        4. Lobes of leaves broadly triangular.................. *Q. ilicifolia*
        4. Lobes of leaves elongated, the upper falcate............. *Q. rubra*
    3. Leaves green on both sides, 5
        5. Main midrib on upper surface of leaf hairy; petioles usually hairy, at least in part; upper scales of acorn cup pubescent, loosely imbricated; sinuses widest at the outside... *Q. velutina*
        5. Main midrib on upper surface of leaf usually glabrous; petioles glabrous or nearly so; upper scales of acorn cup glabrous or nearly so, closely appressed; sinuses contracted at the outside or of same width throughout (nut of acorn globose; acorn cup hemispheric).............. *Q. coccinea*

Quércus álba L. White Oak.

Meaning of Species Name. White.

Other Names. Eastern White Oak.

Type of Plant. A large tree, attaining a maximum height of 150 ft with a trunk diameter up to 8 ft, but usually only 60-80 ft tall with a trunk 1-2 ft in diameter.

Habitat. Dry upland woods, sometimes in rocky or poor soil.

Range. Me and Que to Mich and Minn, s to Fla and Tex.

Distr in NYS. Common across the state s of the Adirondacks, and locally northw both e and w of the mts and up the lower valleys.

Distr in the Torrey Range. Throughout the range.

Time of Fl. May-Jun, fr Sep-Oct; fl May 10-30 at Cornell.

Origin. Native.

Remarks. Wood hard, strong, tough, close-grained, brown; wt 46 lb per cu ft.

The White Oak is one of our largest and most valuable forest trees and is probably the most important of our eastern white oaks, for during the first half of the century it contributed about three-fourths of the lumber sold under that name. Individual trees often live to a great age, far beyond the two centuries required to bring them to maturity; freshly cut stumps of large specimens reveal that they were from three to five centuries old, by actual ring count. In Pennsylvania it is the dominant tree on the windswept hilltops and is especially abundant on the west slopes of the Appalachians and in the Ohio valley.

As Rogers (1926) so well describes it, "The supreme moment in the White Oak's year comes in spring, when the gray old tree wakes, the buds swell and cast off their brown scales, and the young leaves appear. The tree is [then] veiled, not with a garment of green, but with a mist of rose and silver, each twig hung with soft limp velvety leaves, red-lined, and covered with a close mat of silky hairs ... a spectacle that seems unreal because it is so lovely and gone so soon. The protecting hairs and pigments disappear, and green leafage takes its place, brightened by the yellow tassels" of the male flowers. In autumn the pale-lined leaves of the White Oak turn slowly to rich wine and dull purplish tones. The foliage later fades and may persist on the tree until spring.

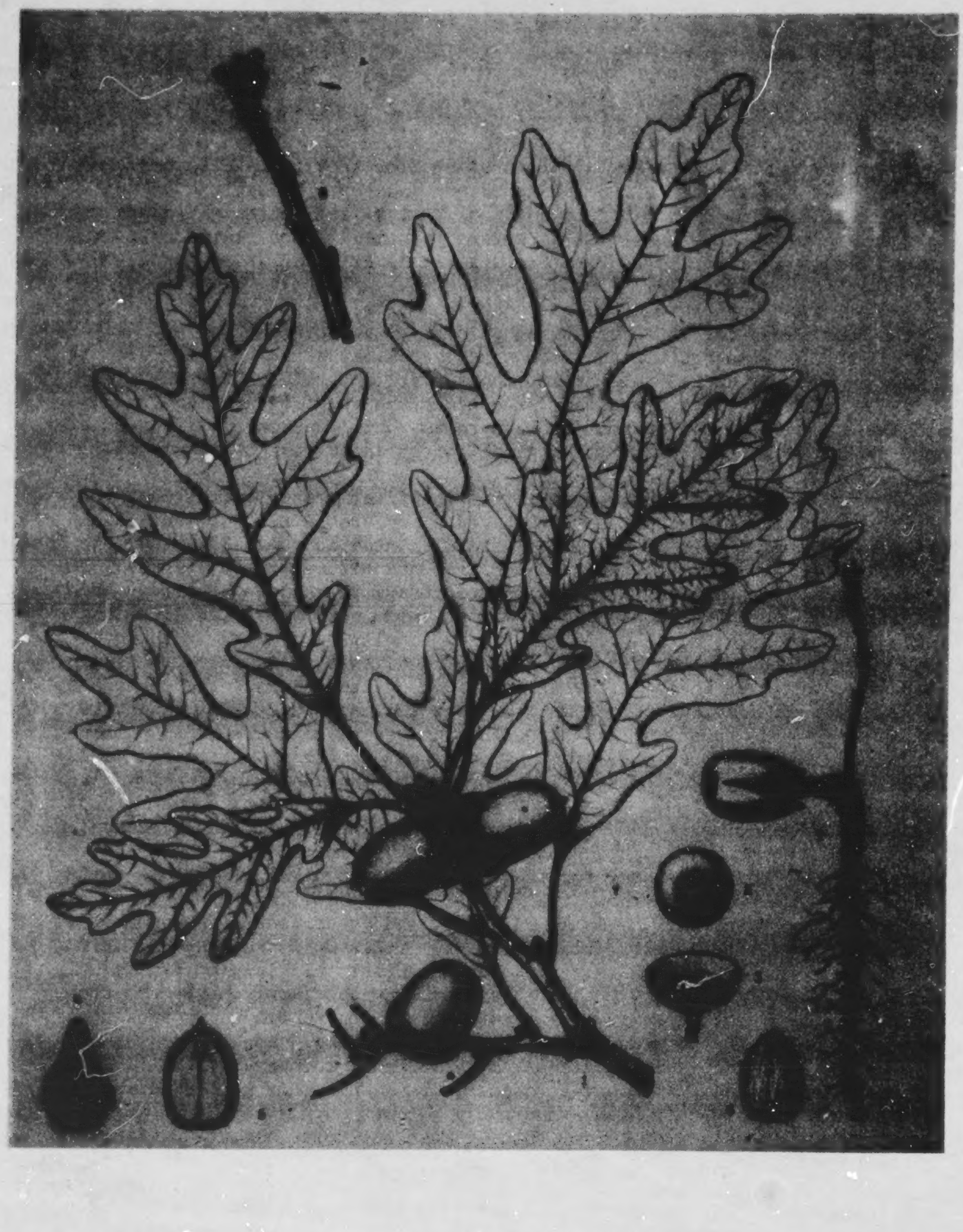
The wood is the heaviest of all our oaks, hard, strong, tough, close-grained, and moderately resistant to decay, although liable to check unless carefully seasoned--a very high-grade, all-purpose wood, incomparable for nearly every purpose for which wood can be used and the best all-around hardwood in America, for it unites the properties of hardness, toughness, and durability to a greater degree than any other native wood. For two centuries the pioneers used it in the construction of their log cabins, mills, barns, and bridges, and in colonial times it had first place in shipbuilding.

It was then in fact employed wherever strength and durability were of utmost importance. Carriage and wagon builders used scarcely anything else; whale boats were constructed largely of White Oak, and many agricultural implements were made of it, including the moldboards and handles of ploughs. For the purpose of making baskets, White Oak was much used because of its great elasticity and suppleness, and the evenness with which it could be divided into narrow strips or ribbons. While the roots were seldom used, except for making knees for the keels of boats, Emerson (1878) suggested that they might be substituted for imported woods used in the manufacture of furniture because of the great beauty which these roots often exhibited. Except for Pitch Pine, it was also a preferred wood for pumps and was much used for railroad ties, fence posts, and mine props. In colonial days it also furnished considerable amounts of charcoal as well.

It was the wood always chosen for old-time buckets, washtubs, kegs, barrels, and casks intended to hold wine and other liquids. Such containers are known as "tight cooperage," meaning containers that will hold liquids, as contrasted with "slack cooperage" for containers intended to hold things other than liquids; for slack cooperage almost any kind of wood might do. The pioneers rived their barrel staves of White Oak by hand and sent large quantities annually to Europe and the West Indies for wine casks and rum barrels.

For generations, too, the early Americans employed great amounts of the bark in tanning. Unfortunately, the trees stripped for this purpose were taken in spring, the time of year yielding the highest amount of tannin but least favorable for logging operations, so the peeled logs were usually left to decay. Always, too, the White Oak has been a fireplace favorite, for as a fuel it is the best wood we have, weight for weight, although Emerson felt that its value as fuel was rather overrated. In addition, both a dark yellow and a light brown dye were extracted from the inner bark and used with an alum mordant for dyeing wool.

Today, though still used for some of these purposes, it is prized most highly for such things as hardwood flooring, furniture, oak paneling, fine cabinet work, railroad ties, agricultural implements, and barrels. The logs, quarter-sawed, reveal the broad gleaming "mirrors" that make a White Oak table beautiful. Botanists call these the medullary rays--thin,



Quercus alba--White Oak
[From Sargent (1891-1902), Vol. VIII, Plate 357, p. 16.]

irregular plates of cells that extend out from the central pith sometimes quite to the sapwood. A slab will show only an edge of these mirrors, but any vertical section from bark to the center of the log reveals them.

Acorns are greedily eaten by squirrels, deer, wild turkeys, jays, and many other birds and mammals. As with most of the other white oaks, the acorns of this species start to sprout soon after they fall in autumn, and many of them are frozen before the roots can penetrate the ground. They are a source of food for the gray squirrel, which "accidentally" plants many of them at a time when they must be covered or die. Seton therefore suggested that a diminishing squirrel population means fewer White Oaks.

What has been said of the oaks as ornamental trees applies especially to the White Oak, for it is beautiful in every stage of its growth. As Sargent (1891-1902) suggests, the great size that it attains in good soil, its vigor, longevity, and stately habit, the tender tints of its vernal leaves when the sunlight plays among them, the cheerfulness of its summer green, and the splendor of its autumn colors make the White Oak one of the noblest and most beautiful trees of the American forest and a prized ornamental.

The acorns of the White Oak mature the first season and, though they are a little bitter for eating out of hand, they are quite sweet and edible after being boiled or roasted. They were much used in various ways by the American Indians, who gathered them in large quantities for winter use. To render the nuts palatable, it was first necessary to remove the bitter and constipating tannin, a substance readily soluble in water. Sometimes they were simply roasted, but the bitterness was usually removed by leaching it out either by boiling the kernels with hardwood ashes in water or by letting cold water run over them. After several washings the acorns were pounded up in a mortar and mixed with corn meal or meat and made into soup, cakes, or pudding. In the mountains of Mexico, the natives still use acorns in this way. When camping, people sometimes grind these acorns into a coarse meal, which is then roasted and mixed with flour to make griddlecakes.

In modern times a number of people, including Fernald and Kinsey (1943) and Gibbons (1962), have successfully experimented with the preparation of acorns for table use, for the thoroughly dried kernels of the white oaks can be quite easily rid of their bitterness by boiling for 2 hours, periodically pouring off the darkened water, and then allowing the commonly blackened kernels to soak in cold water, with occasional changes, until it is convenient to grind them into a paste, preferably within 3 or 4 days. In boiling or in long soaking, much of the sugar is necessarily extracted from the acorn flour, but there is left a nutty meat rich in oil and starch that is as nutritious as the meat of other nuts. Acorn meal can be used to make acorn bread, muffins, and griddle-cakes, using half corn meal or white flour and half acorn meal in any conventional recipe. When this meal is dried in the sun or in a very slow oven, it usually becomes partly caked and must be reground in a food chopper, after which it can be stored almost indefinitely in glass jars. Acorn grits, for use in recipes calling for chopped nuts, can be made by coarsely grinding shelled acorns and roasting them in a slow oven. Because much of the sugar present in the acorns is lost during the leaching process, the nuts are rather tasteless for eating out of hand; dipped in clarified sugar as the French make marrons glacés, however, they are more than much improved.

Of the more than 80 species of oaks in the United States, White Oak was by far the most important one in the medicine of both the red and the white man, for tannin in the inner bark contains powerful antiseptic and astringent properties. This tannin, the agent that gives the bark extract its property of drying up body tissues, is most abundant in the young bark and is said to yield four times as much in spring as in winter. Many Indian tribes recognized its astringent properties and used it in the treatment of diarrhea, dysentery, cuts, and piles, steeping the bark in boiling water and drinking the decoction. Peter Kalm called White Oak bark the best remedy which had yet been found against dysentery, and Dr. Johann D. Schoepf, a surgeon attached to the Hessian mercenaries of the British army during the American Revolution, considered the pulverized bark an excellent substitute for Peruvian bark, for which it was much used during the 19th century. Houma Indians crushed the roots and mixed them with whiskey for a liniment to rub on rheumatic limbs. Even White Oak acorns have been used medicinally. One early writer stated that the Indians of Virginia boiled acorns to extract "an oyle which they keepe to supple their joynts." Some tribes also ate the acorns to induce thirst, believing it beneficial to drink plenty of water. A decoction made from roasted acorns was also once employed in Germany as a remedy for scrofula.

Lighthall (n.d.), an Indian "medicine man," prescribed an infusion of the bark as a wash for old sores and wounds that were not inclined to heal. He also stated that it made a good gargle for sore throat and that it would "cure bad smelling and sweaty feet by washing them with it." When giving it internally for diarrhea, he made a strong tea from the fresh bark and prescribed from a teaspoonful to a tablespoonful every 3 hours until the condition was arrested. White Oak bark was official in the *U.S. Pharmacopeia*, 1820-1916, and in the *National Formulary*, 1916-36, for astringent and tonic purposes. In spite of the fact that it is no longer an official drug, White Oak bark is still in demand by a number of drug companies.

Quercus coccinea Muench. Scarlet Oak.

Meaning of Species Name. Scarlet.

Other Names. Black Oak, Red Oak, Spanish Oak.

Type of Plant. A large tree reaching a maximum height of 100 ft with a trunk 3-4 ft in diameter but ordinarily only 60-80 ft tall with a trunk 1-2 ft in diameter.

Habitat. Dry upland soils.

Range. Me and Ont to Mich and Minn, s to Ga, Ala, Miss, Ark, and Okla.

Distr in NYS. Frequent or common in s NY, especially in the lower Hudson valley and on LI and SI; rare northw to the Mohawk valley and locally westw to L Erie, but not reported from the upper Susquehanna or Chenango valleys; said to be frequent in the s tier of counties from Broome co westw.

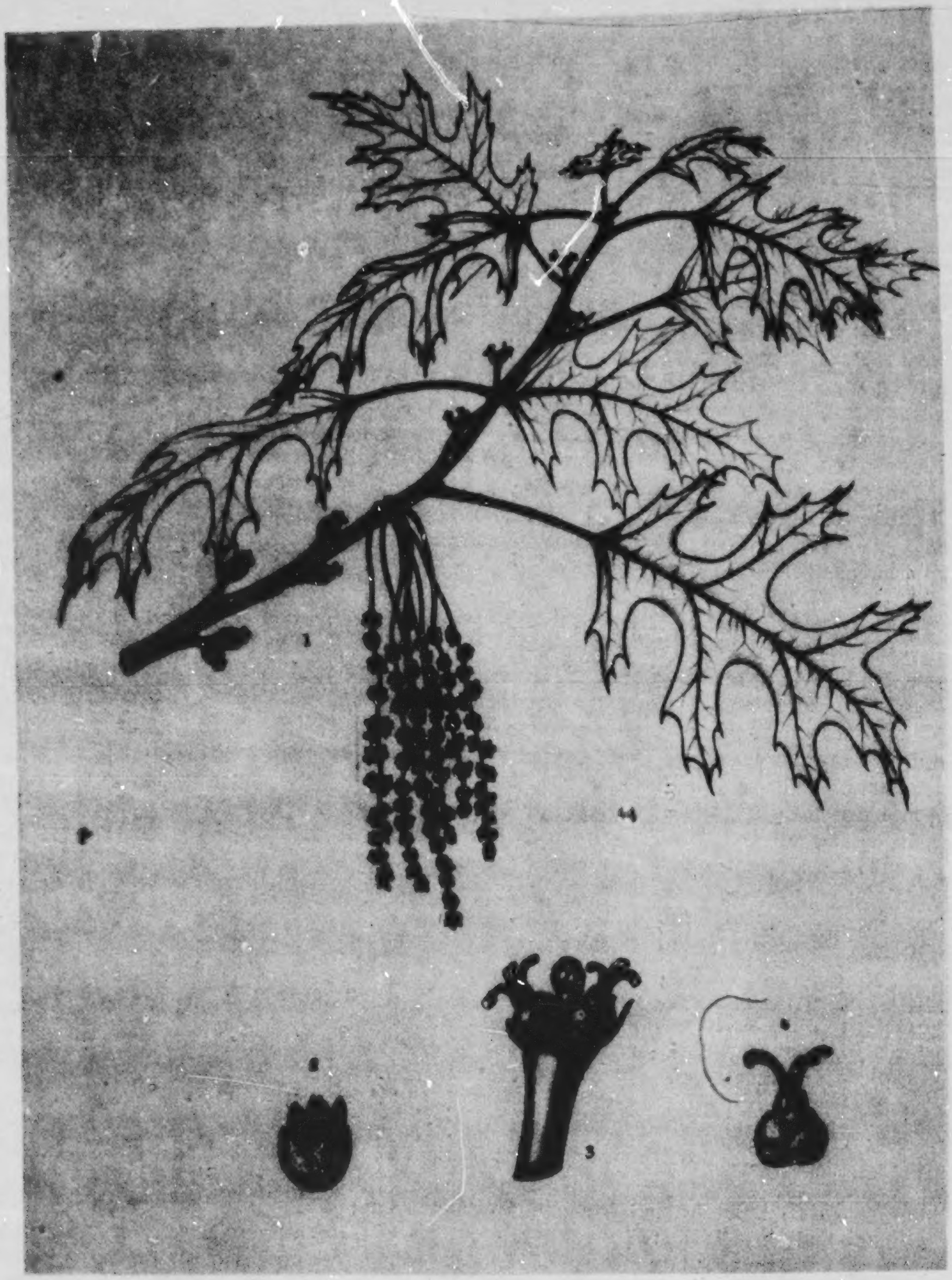
Distr in the Torrey Range. Throughout the range.

Elevation. Has been collected at 2500 ft in Greene co.

Time of Fl. May-Jun, fr Sep-Oct; fl May 10-25 at Cornell.

Origin. Native.

Remarks. Wood hard, strong, light brown or red; wt 42 lb per cu ft.



Quercus coccinea--Scarket Oak
[From Sargent (1891-1902), Vol. VIII, Plate 413, p. 133.]

The Scarlet Oak is well named, for it is like a flaming torch set among the dull browns and yellows in our autumnal woods, a rival even to the orange of the Sugar Maple and the gold of the aspens. In spring the opening leaves are red; so are the tasseled catkins and the forked pistils that turn into acorns later on. Even in summer, when the leaves are a glossy green, the red inner bark of the Scarlet Oak sustains the reputation of its name, as one can see if he scratches with a penknife under the thin outer bark of a twig. This medium- to large-sized tree is one of our most handsome oaks.

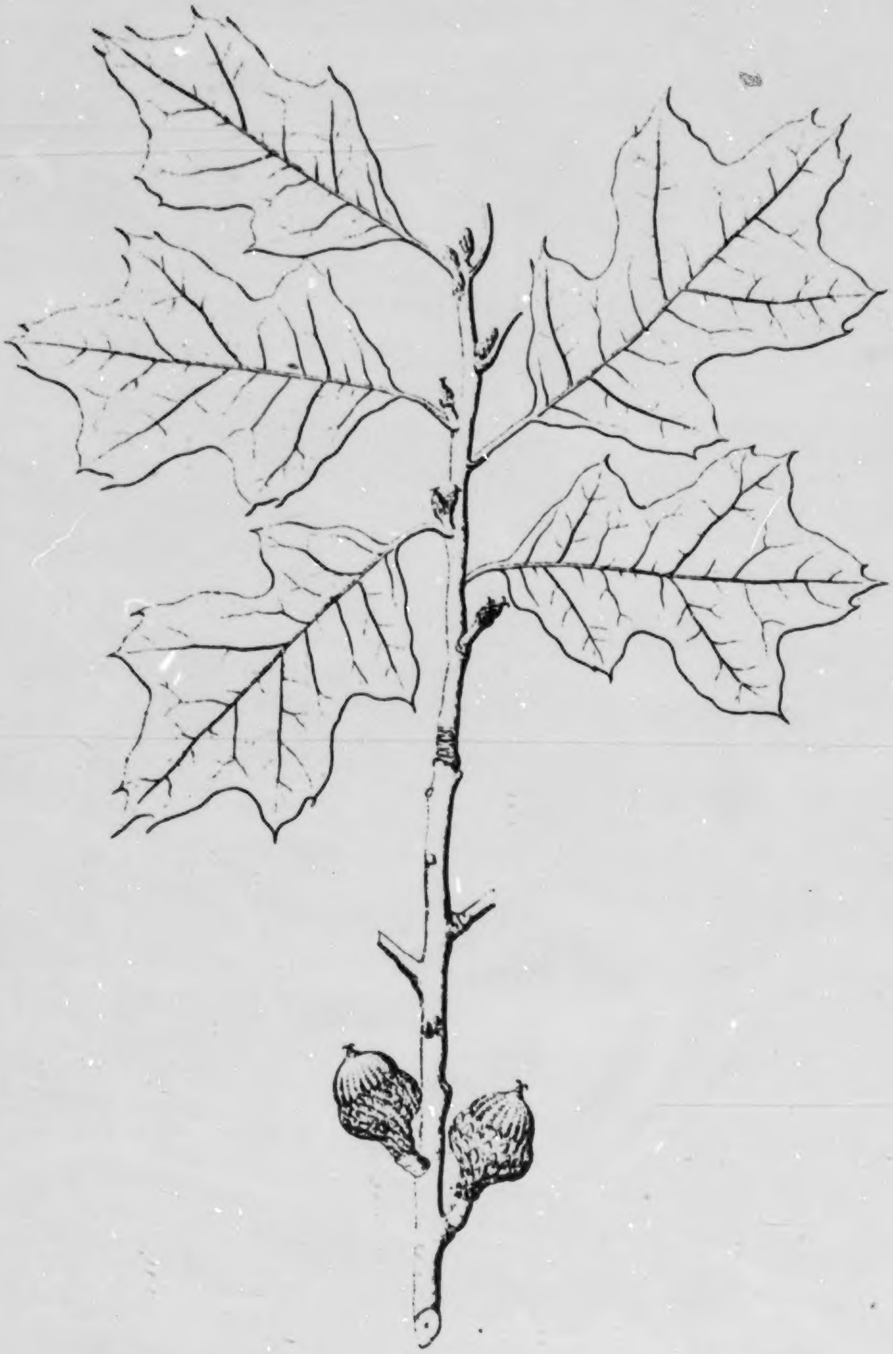
When young it has a more or less pyramidal crown with drooping lower branches, but in age it becomes rather broadly round-topped; the persistent drooping lateral branches are quite characteristic. It is distinctly an upland tree, preferring to grow on dry sandy or gravelly soils and rocky slopes, where it often associates with other oaks and hickories. It grows rapidly and has both an attractive form and foliage, the latter becoming a brilliant scarlet in autumn. Its acorns are of some value as food for wildlife.

For an oak, this tree is strikingly slender and graceful, delicate in branch, twig, and leaf--quite out of the sturdy, picturesque class in which most oaks belong. The leaf, fluttering on a long flexible stem, is thin and silky smooth, its lobes separated by sinuses so deep that it is a mere skeleton compared with those of the Red Oak. The trimness of the leaf is matched by the neat acorn; the scales of the cup are smooth, tight-fitting, and curl in at the rim.

The wood is medium-heavy, hard, strong, and coarse-grained, with reddish-brown or light brown heartwood and thick, darker sapwood. As a timber tree it is often marketed as either black or red oak, but the lumber is generally regarded as being inferior to that of the Northern Red Oak. Although about as heavy as White Oak, the wood of Scarlet Oak is considerably stiffer and stronger; it has therefore been in demand for agricultural implements, boats, wagons, vehicles, slack cooperage, and chair stock, for it is attractive enough in grain for use as furniture material. It is one of the most abundant oaks of the southern Appalachians but the largest trees grow in the fertile uplands of the Ohio valley. In New England it is one of the most brilliant of trees in the autumn forest. It is often planted as an ornamental, shade, or street tree as much for its beauty of form as for its brilliant fall foliage.

Quercus ilicifolia Wang. Scrub Oak.

Meaning of Species Name. Holly-leaved.
Other Names. Bear Oak, Holly Oak, Bitter Oak, Barren Oak, Bitterbush, Black Scrub Oak, Dwarf Black Oak.
Type of Plant. A shrub, rarely a small tree, attaining a maximum height of 25 ft but usually only 3-10 ft high with a thicket-forming habit.
Habitat. Dry, rocky, gravelly, or sandy barrens.
Range. Me to c NY, s to Md, w NC, WVa, and O.
Distr in NYS. Common on LI and SI, the Hudson highlands, the sandy plains of Albany, Schenectady, and Saratoga co, and occasional westw to the Chenango, Susquehanna, and Tioga valleys.



Quercus ilicifolia--Scrub Oak
[From Emerson (1878), Vol. 1, plate facing p. 170.]

Distr in the Torrey Range. Throughout the range.
Time of Fl. May, fr Oct-Nov.
Origin. Native.
Remarks. Wood hard, strong, light brown.

Scrub Oak, which grows readily in the most exposed situations and on the poorest soils, is generally considered of very little value and often regarded as a nuisance. Seton says it was called Bear Oak because that animal was about the only one that would eat its intensely bitter acorns, which it usually produces in great abundance. Few shrubs are wholly without some redeeming features, however. Aside from Michaux's suggestion that it might be usefully employed as a hedge, it prevents soil erosion, protects the seedlings of more valuable trees, and affords cover for wildlife.

Quercus prinus L. Chestnut Oak.

Meaning of Species Name. The Greek name of the European Oak.

Other Names. Rock Chestnut Oak, Swamp Chestnut Oak, White Chestnut Oak, Rock Oak, Tanbark Oak, Mountain Oak.

Type of Plant. A large tree with a maximum height of 100 ft and a trunk diameter of 5 ft but usually only 50-60 ft high with a trunk 1-2 ft in diameter.

Habitat. Dry or rocky woods, bluffs, and crests, mostly in siliceous soil.

Range. Me to Ont and Ind, s to Va, mts to Ga, Ala, and Miss.

Distr in NYS. Frequent in the Hudson valley northw to L Champlain and westw to c NY and L Erie; increasingly abundant southw in the Appalachian plateau reg.

Distr in the Torrey Range. Throughout the range.

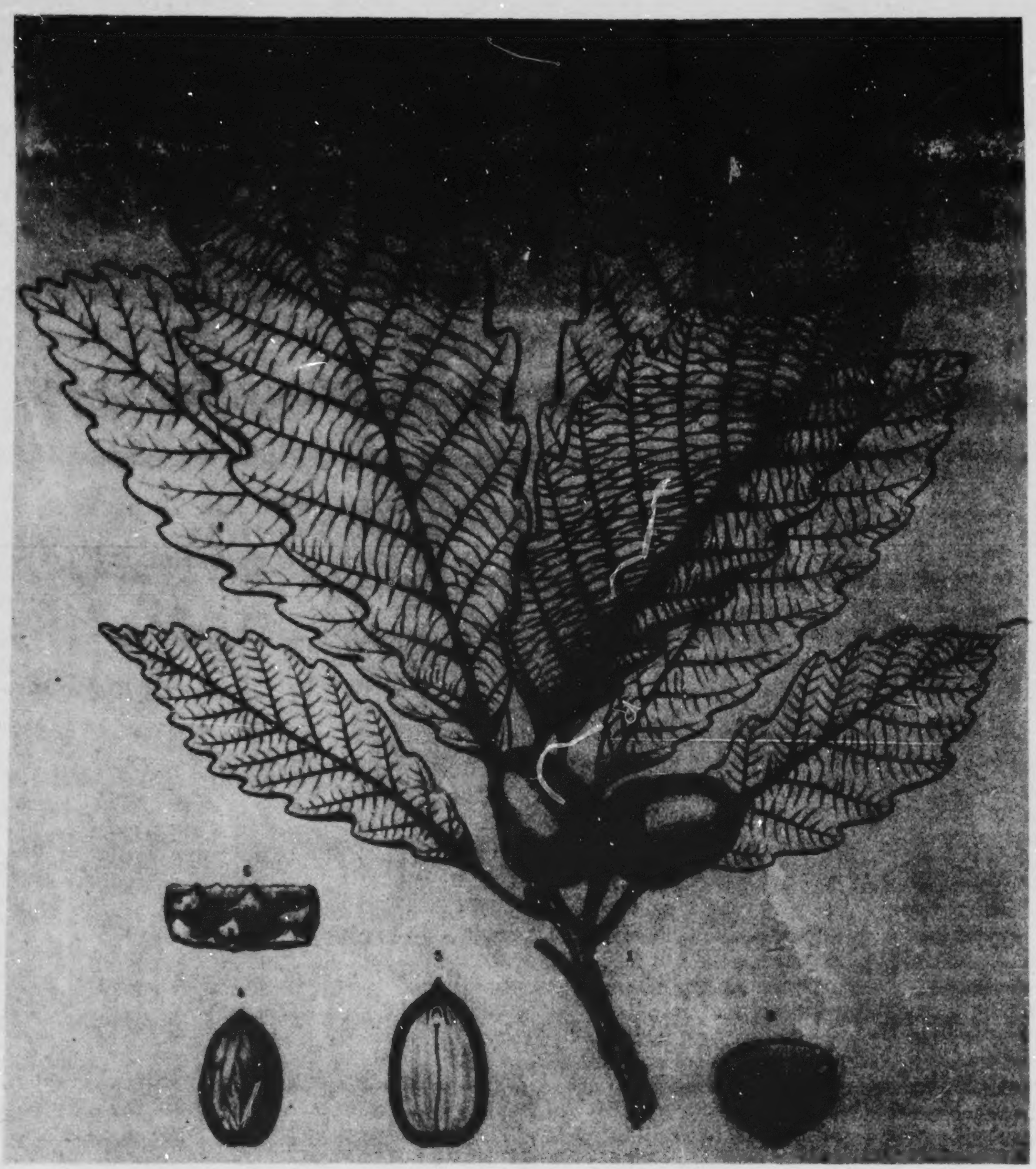
Time of Fl. May-Jun, fr Oct-Nov; fl May 15-30 at Cornell.

Origin. Native.

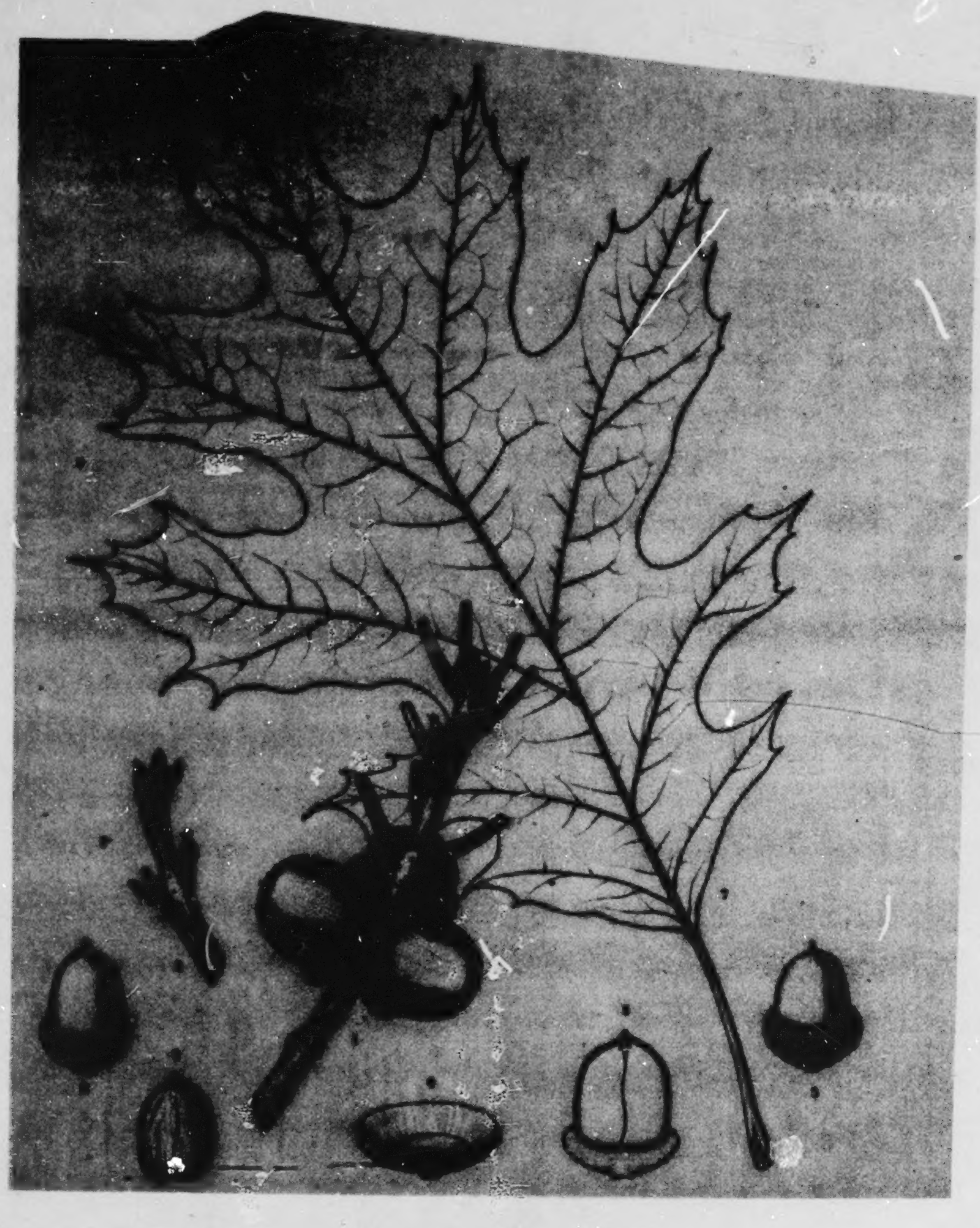
Remarks. Wood hard, strong, close-grained, durable, dark brown; wt 47 lb per cu ft.

Unlike other white oaks, the bark of a mature Chestnut Oak is dark in color and deeply fissured; without a look at the leaves, one might call it a red oak. Although Chestnut Oak has come to be its generally accepted name, Rock Oak is certainly equally appropriate, for it is predominantly a tree of rocky places. It attains its largest size on the lower slopes of the mountains of the Carolinas and Tennessee where, on dry hills, it often forms a large part of the forest growth.

The wood is heavy, hard, strong, rather tough, close-grained, and durable in contact with the soil, but difficult to season. In the 1800's it was much used in fencing, for railway ties, and for fuel. Col. William Byrd, who wrote *Neugefundenes Eden* to entice Germans and Swiss to settle on his lands, stated that one could make very beautiful boards or chests from the lumber of this tree, but handsome as was its lumber, its chief use in the early days was for tanning. Oak bark was deemed the best for preparing fine leather. No other American oak has so high a tannin content, so it was consumed in large quantities during the last century for use in the tanning industry. The tannin obtained was often combined with that from hemlock to offset the objectionable red color of the latter. Today synthetic tannins are frequently used and few people are aware of the process by which a hide becomes a pair of shoes (if, indeed, the shoes are made of leather). In the Catskills of the last century, however, the hide might have come from a beast you knew well, and the tannery that prepared it was, like the smithy, a natural and necessary part of the community. In his *Travels* in 1802,



Quercus prinus--Chestnut Oak
[From Sargent, (1891-1902), Vol. VIII, Plate 376, p. 51.]



Quercus rubra--Northern Red Oak
[From Sargent (1891-1902), Vol. VIII, Plate 410, p. 125.]

François Michaux well described the tan mills of North Carolina:

> "The woods are in a great measure composed of different kinds of oaks ... In all the towns that I have traveled through every tanner has his tan mill, which does not cost him above ten dollars to erect. The bark is put into a wooden arch, twelve or fourteen feet in diameter, the edges of which are about fifteen inches high, and it is crushed under the weight of a wheel, about one foot thick, which is turned by a horse, and fixed similar to a cyder-press. For this purpose they generally make use of an old millstone, or a wooden wheel, formed by several pieces joined together, and furnished in its circumference with three rows of teeth, also made of wood, about two inches long and twelve or fifteen wide."

To this primitive woodland tannery came great quantities of the bark of Chestnut Oak. Like the hemlocks, they were at that time felled, stripped of their bark, and left to decay in the woods. Such practices seem shocking in this day and age when wood is becoming increasingly scarce and more and more use is being made of the ubiquitous plastic as a substitute. Time has taught us better; indeed, when the first scarcity of White Oak began to show itself, it was the lumberman's second choice, for it ranks close to White Oak in quality and is currently harvested as "white oak" lumber and used for the same purposes.

Few oaks of eastern America surpass this species in beauty or strength and vigor; it often grows to a venerable age and is always an interesting and handsome object. The Chestnut Oak is therefore a desirable tree for horticultural use. It is symmetrical, with handsome bark and foliage, and the long unlobed leaves, so softly shining, hang like green curtains from its spreading boughs, turning yellow and keeping their fine texture through the season. It is perhaps most attractive in the hazy light of a warm autumn day, when the sunlight, flickering through the branches, illuminates its dusky trunk and yellow leaves.

Byrd described the acorns of this species as "large and sweet as the best chestnuts," but perhaps only the squirrels would agree. Nevertheless, in areas where this species abounds, the use of these acorns might well be investigated as a source of food. From the bark of this species a dark yellow-tan color was produced with a chrome mordant, while an alum mordant resulted in a light brown. In areas where it does not reach commercial proportions, it prevents erosion on poor sites often barren of other tree growth. With the loss of the chestnut, which formerly was one of its principal associates, the rather sweet acorns of the Chestnut Oak have become the most important source of mast along our mountain ridges, relished by the gray squirrel, black bear, white-tailed deer, wild turkey, and many other forms of wildlife, but they do not provide as dependable a food supply as the chestnut once did.

Quercus rubra L. Northern Red Oak.

Meaning of Species Name. Red.

Synonyms. Q. borealis Michx. f. var. maxima (Marsh.) Ashe in Gleason (1952).

Other Names. Black Oak, Spanish Oak, Gray Oak, Red Oak, Champion Oak.

Type of Plant. A large tree with a maximum height of 140 ft and a trunk diameter of 7 ft but usually only 70-80 ft high with a trunk 2-4 ft in diameter.

Habitat. Dry or moist hillsides and upland woods.

Range. NS to Mich and Minn, s to Va, Ala, Miss, Neb, and Ark.

Distr in NYS. Common across the state chiefly outside the Adironcacks but not infrequent in some of the lower valleys and foothills of that reg.

Distr in the Torrey Range. Throughout the range except in the pine barrens, there wanting; always increasing northw.

Elevation. Has been observed at 3000 ft in Delaware co.

Time of Fl. May-Jun, fr Oct-Nov; fl May 15-25 at Cornell.

Origin. Native.

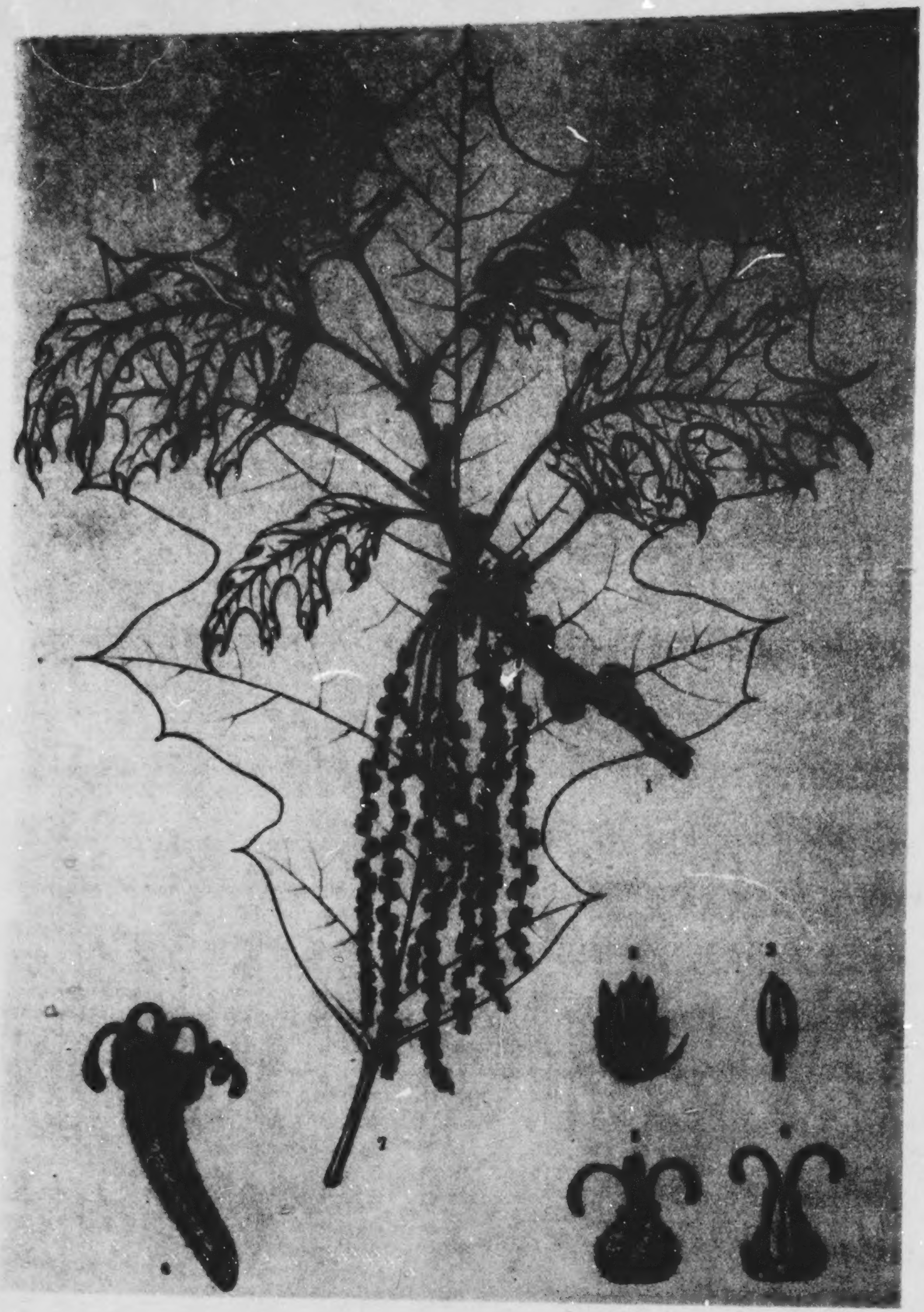
Remarks. Wood hard, strong, coarse-grained, light reddish-brown; wt 41 lb per cu ft.

The Northern Red Oak is one of the largest and most widely distributed, and commercially the most valuable, of the red oak group. This species grows rapidly, but it does not attain the great age of the White Oak; few probably live longer than 200 or 300 years. It is outstanding both as a shade and a timber tree, growing farther north than any of the other red oaks and proving the most hardy of American oaks grown in Europe, where it was introduced in the late 17th century.

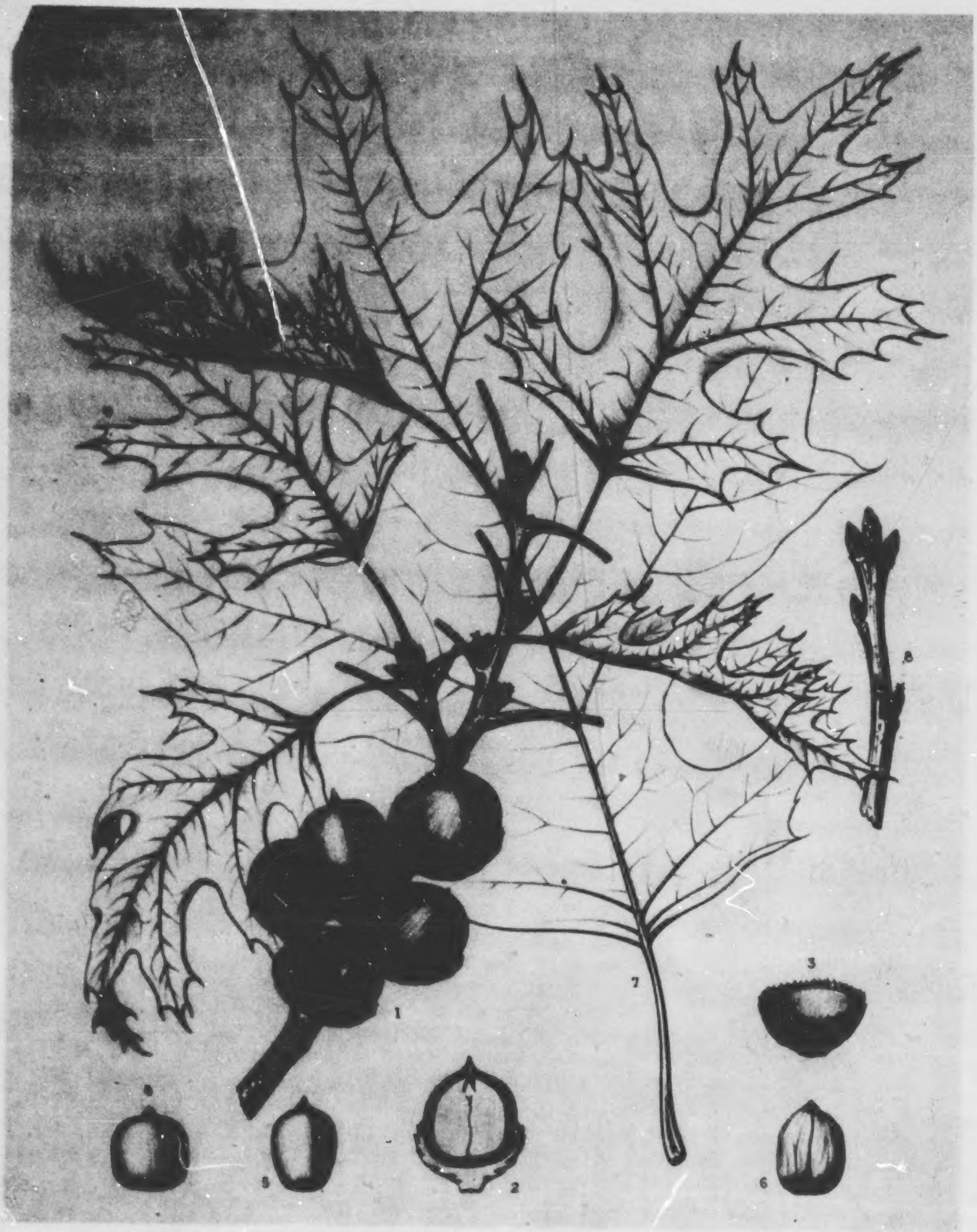
In Emerson's day, when high-quality lumber was more readily available, few lumbermen would look twice at a Red Oak, for its timber was not held in very high repute, it being considered of little value for fuel or for most purposes as timber, although it was known to last for more than a century when beams cut from it were employed in the framework of buildings. It was liable to check badly in drying, it was so porous that it could not be used for tight cooperage, "The sour and acrid juices, which can hardly be expelled from the wood by natural or artificial seasoning, rapidly corrode iron spikes which are driven into it; and the bark is almost worthless for the use of the tanner.... From having names given to it which belong to far more valuable species it has, in many places a better reputation than it deserves," Emerson (1878) concluded, adding, "It is used, and that only for inferior purposes, where no other species of oak can be obtained."

With the advent of the dry kiln the better to control the seasoning process and the increasing scarcity of other timber, however, Red Oak has come into its own. Its light reddish-brown wood is hard, strong, and coarse-grained, but it is not quite so heavy and strong as that of the White Oak. As lumber it is now quite widely used for such purposes as rough lumber, clapboards, flooring, interior finish, furniture, slack cooperage, general millwork, agricultural implements, boats, woodenware, handles, boxes, and crates. When treated with preservatives, it was early used for railroad ties, mine timbers, and fenceposts. Fortunately the tree grows so rapidly that dimension timbers can be cut from the growth made during a man's lifetime--something that can be said of few oaks of any value.

There were few trees or shrubs for which Emerson could not find some useful purpose, however; "like some individuals in a higher field of creation," he concluded somewhat wryly, "it compensates in some measure for its comparative uselessness, by its great beauty. No other oak flourishes so



Quercus velutina--Black Oak (flowers)
[From Sargent (1891-1902), Vol. VIII, Plate 414, p. 137.]



Quercus velutina--Black Oak (fruit)
[From Sargent (1891-1902), Vol. VIII, Plate 415, p. 137.]

readily in every situation; no other is so rapid of growth; no other surpasses it in beauty of foliage and of trunk; no oak attains, in this climate, to more magnificent dimensions; no tree, except the white oak, gives us so noble an idea of strength." No oak of the northern states can more easily be transplanted, and few trees are better suited to ornament the parks, streets, or home grounds of the northern United States. It is a favorite, too, in Europe, where it has been appreciated since it was first planted in Bishop Compton's garden near Fulham, England, in the late 1600's.

Its bark was useful to 19th-century dyers in dyeing wool, a rose-tan being obtained with no mordant, tan and yellow-tan with a chrome mordant, and a light brown with an alum mordant; with an alum mordant it would also dye cotton a rose-tan.

The acorns are larger than those of any other of the red oaks--often an inch or more long and almost as broad. While not so palatable as those of the white oaks, they are much utilized as food by squirrels, deer, and many other forms of wildlife.

Quércus velùtina Lam. Black Oak.

Meaning of Species Name. Velvety, from the young foliage.
Other Names. Yellow-barked Oak, Quercitron, Dyer's Oak, Spotted Oak, Yellow Oak, Tanbark Oak.
Type of Plant. A large tree with a maximum height of 150 ft and a trunk diameter of 5 ft but usually only 60-80 ft tall with a trunk 2-3 ft in diameter.
Habitat. Dry or sterile rocky upland soil and dunes.
Range. Me to Mich and Minn, s to Fla, Neb, and Tex.
Distr in NYS. Common across the state northw to L George and Saratoga co, in c NY about Oneida L and in Oswego co, and in the Ontario lowlands westw to L Erie.
Distr in the Torrey Range. Throughout the range.
Time of Fl. May-Jun; May 15-25 at Cornell.
Origin. Native.
Remarks. Wood reddish-brown; wt 44 lb per cu ft.

The Black Oak, more variable in its leaf and fruit characters than any other northern oak, is typically a tree of dry rocky or gravelly slopes and ridges, where it commonly associates with other oaks, attaining its largest size in the valley of the lower Ohio river. Its leaves are often mistaken for those of Red Oak and at times they are as deeply lobed as those of Scarlet Oak, but the squarish lobes of the leaves of Q. velutina are paired and each has a strong vein from the midrib; in addition, the underside of the leaf is always scurfy. Other distinctive features of the Black Oak include its rather large pointed buds coated with a dull whitish down, and the bright orange to yellow color of its inner bark, revealed by scratching a twig with a thumbnail. The acorns, too, are usually sufficiently distinctive to help in identifying the tree; less than an inch long, they are about half enclosed by a deep top-shaped cup on which the upper rows of scales have loose, spreading tips. The kernels of these acorns are yellow and intensely bitter.

The wood is medium-heavy, hard, coarse-grained, and strong but not tough, and is liable to check during the drying process. The wood, used for flooring, interior finish, furniture, boxcars, slack cooperage, general construction, and other fundamental but prosaic purposes, passes as just "red oak" when lumbermen trouble to cut it. Too often, however, the trunks are short and crooked, knotty and cracked even in the living tree; or, in trees old enough to yield dimension timber, they are inwardly decayed. Black Oak is likewise too heavy in form, too narrow in crown, and too unkempt in its winter outline ever to be a favorite for ornamental use, for it has none of the grace that makes many other species of oak perfect dooryard trees. "But," remarks Peattie (1950), "as a forest tree, as part of the hard, untamed, original sylva, it has a rough, unbending grandeur of its own ..."

In the days before the invention of aniline dyes, a yellow pigment called quercitron, obtained from the inner bark, was an important article of commerce, for it was early discovered that the bark of this tree, more potent than the dye produced by any other native bark, could be used for dyeing woolens, cotton, linens, and silks an intense bright yellow. A gold color was also imparted to wool by using a chrome mordant, an alum mordant produced a yellow-tan color, and a tin mordant produced an orange on silk. Its tannin-rich bark was also used for tanning hides, but the yellow dye was a handicap as it had to be extracted before the bark could be thus used. The potter, it is said, selected this tree in preference to others as fuel for his kiln, and the inner bark was also sometimes used medicinally in the form of decoctions as an astringent and in external applications. The Meskwakis mixed the inner bark with other roots for use in lung troubles, while the Menominees crushed and boiled the bark to furnish a watery infusion for sore eyes. The inner bark of this species was official in the U.S. Pharmacopeia, 1820-73, as an astringent and antiseptic.

Black Oak bark was sent to England before the Revolution from Wilmington, Delaware, and an export trade in this article was subsequently developed. In 1785 the British Parliament awarded Dr. Edward Bancroft for several years the exclusive right to use and apply this dyestuff (which he named quercitron) to dyeing and calico printing, and soon thereafter it took its place among the important vegetable dyes, remaining in commercial use through the second quarter of the 20th century. In 1810, 1812, and 1822 patents were issued to Americans who had developed improved methods of preparing quercitron and its extract, and later in the century other patents were issued to inventors of bark crushers, grinders, packers, and the like, indicating continuous efforts to improve quercitron and other dyewood processing.

Fresh oak bark, collected in the spring then dried and powdered, can be used, but a pure dye extract, more powerful than the bark itself, is made from the powdered inner bark; it is still available from dye supply houses and is much easier to use. A mordant is not essential but it is usually advantageous to use one. To dye 1 pound of wool a gold color, dissolve 1/2 ounce of quercitron extract in the usual 4 to 4 1/2 gallons of lukewarm water. Immerse the wet wool which has just been mordanted with chrome, heat slowly, and simmer for 1 hour. When it has cooled somewhat, rinse well and dry.

URTICÀLES

The four families comprising the Urticales are now generally accepted as phyletically advanced, having close affinities with the Malvales, the Rhamnales, and the Euphorbiales, which Thorne (1973) placed in his superorder Malviflorae, together with two other orders.

Key to Catskill Genera of the Urticales

1. Trees or shrubs, 2
   2. Sap milky; leaves with 1 or 2 thumblike lobes; fruit fleshy, edible, short-cylindric, resembling a blackberry................ *Morus*
   2. Sap watery; fruit a flat winged samara (flowers on branches of the preceding year, developing before the leaves)........... *Ulmus*
1. Herbaceous plants, 3
   3. Leaves palmately 3-5-lobed (plant twining; stems retrorsely spinulose; pistillate flowers in close conelike axillary spikes, in fruit covered by the undivided bracts)............ *Humulus*
   3. Leaves not lobed, 4
      4. Leaves strictly alternate (coarse herbs with large toothed leaves and stinging hairs)............................ *Laportea*
      4. Leaves opposite, 5
         5. Plants glabrous, smooth and shining, the stem translucent.. *Pilea*
         5. Plants variously coarse-pubescent, 6
            6. Plants with stinging hairs; flower clusters in panicled spikes.................................. *Urtica*
            6. Plants without stinging hairs; flower clusters in simple axillary spikes........................ *Boehmeria*

ULMÀCEAE, the Elm Family

This is a family of about 15 genera and some 160 species distributed throughout much of the northern hemisphere and more particularly in the tropics and subtropics. Species of 3 genera are indigenous to North America--*Ulmus*, *Celtis*, and *Planera*, the latter with a single species in the southeastern states. The family is not of major economic importance, although *Ulmus* is a source of lumber used to a limited extent in furniture-making, and the mucilaginous bark of *U. rubra* is utilized in the manufacture of medicinal products. Seeds of some species of *Celtis* are edible, and the fragrant wood of *Planera abelica* is known in the cabinet trade as False Sandalwood. In addition, several genera and species are grown domestically as ornamentals.

Úlmus L. Elm.

There are about 20 species of elms, deciduous or sometimes subevergreen trees or shrubs chiefly of eastern North America and Eurasia, with purplish or yellowish flowers in lateral clusters. In most species the flowers appear in early spring well in advance of the leaves, but one or two species flower later in the year. The leaves are straight-veined, double-toothed (except for the Siberian Elm), short-petioled, and oblique or unequally somewhat cordate at base. They may vary a great deal in size, with the normal kind on ordinary branches and very large leaves produced by vigorous shoots from adventitious buds on the trunks. The fruits are wafer-like, the single seed occupying a more or less central position and being surrounded by a wide, papery wing. The seeds ripen during early summer, but sometimes only a small percentage are fertile. The name of the genus is the classical Latin name for the European Elm.

The common European Elm (U. campestris) is found throughout a great part of Europe, northern Africa, and Asia Minor, whence it ranges east to northern Asia and Japan. The wood, noted for its toughness and difficulty in splitting, has considerable transverse strength, does not crack when once seasoned, and is remarkably durable under water. It is close-grained, hard, and free from knots, but it does not take a high polish. It was long used for keels and bilge planks, the blocks and deadeyes of rigging, ships' pumps, coffins, wheels, furniture, carved and turned articles, and for general carpenters' work. Elm boards were also largely used for lining the interiors of carts, wagons, and wheelbarrows because of the extreme toughness of the wood. Previous to the general use of iron and copper, elm was very much in demand for water pipes.

The Scotch or Wych Elm, U. glabra, is the common elm in northern Europe. The wood of this species is also hard and tough when properly seasoned, and, being very flexible when steamed, is well adapted for boatbuilding. Branches of this elm were also formerly used in the manufacture of archery bows, and forked branches were employed as divining rods. In Norway the inhabitants used to dry the bark and in times of scarcity ground it into a meal to be mixed with flour for bread. The fruit, in a green state, was sometimes eaten as a salad. Some years ago in England an immense quantity of dried elm leaves was used for adulterating tea and for manufacturing a substance intended to be used as a substitute for it. In Russia the leaves have also been used as tea. In times of scarcity, the bark, leaves, and fruit are all eaten in the northern provinces of China. The Chinese also use the inner bark in the composition of incense sticks. In other areas the leaves and young shoots have been found suitable as food for livestock.

The mucilaginous inner bark of some species has been dried for medicinal use as a tonic, demulcent, astringent, and diuretic; it was official in the British Pharmacopeia of 1864 and 1867. Among other uses, it was then employed for the preparation of an antiscorbutic decoction recommended in such cutaneous diseases as ringworm. A medicinal tea was also formerly made from the flowers.

The large-growing elms are most decorative trees. They have been so widely used as shade trees in some areas, such as New England, that they have become a very definite feature of the landscape. Several exotic species also are often planted as street trees. Both the Scotch Elm and several of its varieties have been freely planted in North America; the Weeping Wych Elm, var. pendula, is particularly popular by reason of the regularity of its weeping branches, and other varieties are handsome shade trees for planting on lawns. U. parviflora, the Chinese Elm, a native of China and Japan, is partially evergreen in mild climates but completely deciduous in winter in the north. While it is hardy in the north, it cannot be grown so far north as U. pumila, the Siberian Elm. Like the Chinese Elm, it grows fast, but its wood tends to be weak, so that the tree is easily damaged by storms.

Because elm is heavy, hard, tough, and difficult to split, it is generally not used as campfire material unless nothing more tractable can be found. The inner bark, particularly of the roots, is generally tough and fibrous and has been used by primitive peoples in many parts of the world for making ropes, coarse mats, and even cloth of a sort; campers may find the inner bark of American elms useful for twisting into improvised rope, fishlines, nets, or snares.

Martin et al. (1951) remark that the value of elms to wildlife is low as compared with oaks, maples, and dogwoods. Nevertheless, the seeds, buds, twigs, and foliage are important food items for numerous birds and mammals, including the wood duck, wild turkey, purple finch, and red squirrels, particularly as our native species mature early in the spring before many other seeds are available.

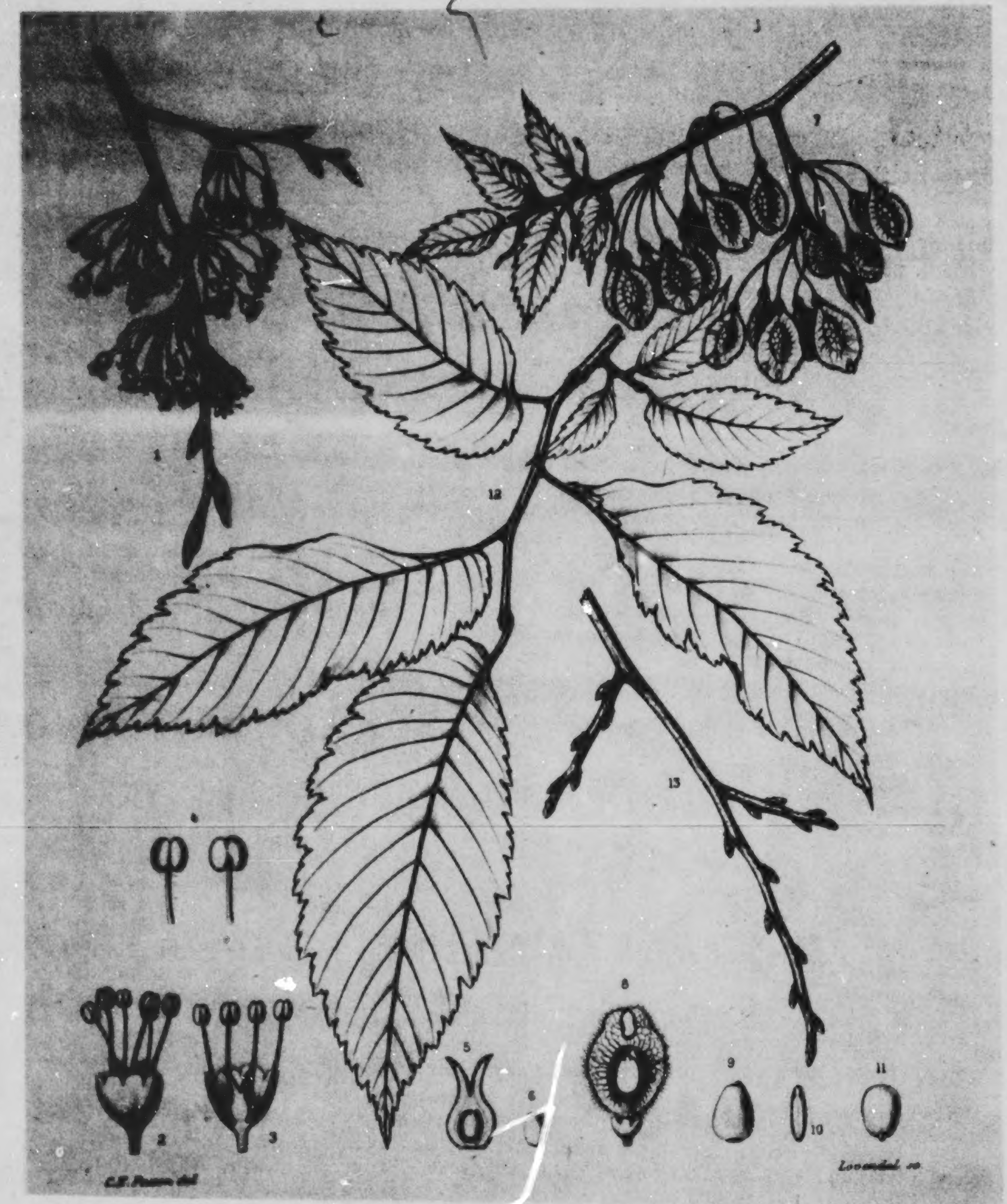
Unfortunately, American and European elms are subject to the Dutch elm disease, except for a small number of seedlings derived from U. carpinifolia. Cuttings from these have been rather widely planted both in Europe and in the United States. Chinese and Siberian elms appear to be more resistant to this disease.

Key to Local Species of Elms

1. Leaves smooth or nearly so on the upper surface; twigs and buds smooth to short-pubescent; flowers slender-pedicelled, soon pendulous; fruit densely ciliate-fringed on each margin; bud scales dark-margined.. U. americana
1. Leaves very scabrous on the upper surface; twigs scabrous, buds downy with rusty hairs; flowers short-pedicelled, in dense capitate clusters, not drooping; fruit not ciliate; bud scales uniformly dark.. U. rubra

Úlmus americàna L. American Elm.

Meaning of Species Name. American.
Other Names. White Elm, Water Elm, Swamp Elm, Rock Elm, River Elm, Soft Elm, Gray Elm.
Type of Plant. A large tree with a maximum height of 120 ft and a trunk diameter of 11 ft, but ordinarily only 75-100 ft high with a trunk 2-6 ft in diameter.
Habitat. Usually in moist fertile soil, especially along streams or in lowlands, nearly throughout our forested region.
Range. Nf to Man and Sask, s to Fla and Tex.
Distr in NYS. Common throughout the state but rare or absent in the Adirondacks above 2500 ft.
Distr in the Torrey Range. Throughout the range except in the pine barrens of NJ and e and s of them; not known as a wild tree in LI.
Time of Fl. Mar-Apr, fr May; fl Apr 1-20 at Cornell.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Ulmus americana--American Elm
[From Sargent (1891-1902), Vol. VII, Plate 311, p. 43.]

Origin. Native.

Remarks. Wood hard, medium-weak as a beam but very tough and difficult to split, coarse-grained, compact, brown; wt 35 lb per cu ft.

The American Elm, growing naturally in bottomlands and along streams, is one of the most widespread and well known of our native trees and in the north is a favorite shade tree for street planting, for without doubt it is one of the most handsome of our native trees. The drooping branches give an air of grace and dignity that few other trees can match, and its form is so characteristic that it can easily be recognized even at a distance. The early colonists, quick to take advantage of its beauty, planted American Elm as a shade tree on the commons, along the streets, and in parks and gardens of towns all through New England, so that section has long been famous for its large elms, which give the landscape a special character. Because of its fundamental architectural form, this is the ideal street tree, for its branches meet across the road in a vaulted arch that permits the passage of the highest vehicles. The leaves make a pattern roughly like a lattice, hence the dappling of light and shadow is fully half the charm of this tree.

With the first warm weather of April, little clusters of flowers burst from the larger and plumper buds on the twigs. Later in the month or early in May the branches show the first flush of green as the small one-seeded fruits mature; the trees are then often full of goldfinches and purple finches, musically twittering as they dine on the seeds. The seeds are also eaten by bobwhite, ruffed grouse, gray and fox squirrels, and opossum; cottontail rabbits, snowshoe hares, and white-tailed deer browse the twigs; the buds are eaten by several birds, including ruffed grouse; and its drooping boughs are often chosen by the Baltimore oriole as nest sites.

The bark was found useful by the Indians for making canoes and large barrels as well as for numerous types of utensils. Rope was made from the fibrous portion of the bark, for when macerated in water and rendered supple by pounding, it can be twisted into a strong cord. The inner bark of the American Elm, like that of the Slippery Elm, is available as an emergency food, but with most tribes it was never a general article of diet. A number of tribes, however, made use of the inner bark of this species in medical preparations, steeping it to make a decoction for the treatment of dysentery, coughs, colds, and bleeding of the lungs, but sometimes it was simply drunk as a tea. By some tribes it was also used as an eye lotion. Because elm wood is hard and tough, the Indians found it most useful for making mortars and pestles with which to grind medicines and perfumes. Both wood and bark have been used to dye cloth, and the early settlers soaked the bark in water and pulled off long flat strips for making chair bottoms.

The wood of the elm is only moderately heavy and hard, and it is coarse-grained, tough, strong, and has a cross-grain that makes it difficult to split, but its defects are also its virtues. Its toughness and peculiar grain made it the preferred wood for the hubs of wagon and carriage wheels, its interlacing fibers uniquely fitting this wood for resisting both pressure and friction. Large amounts were also employed in the manufacture of agricultural implements, furniture, sporting goods, in shipbuilding and heavy-duty flooring, barrels and basket handles. In fact, it was used wherever shock-resistance was essential. It holds screws better than almost any other wood, and so is valuable for boxes and crates. It was also much used for flumes and piles, for it resists decay on exposure to water. It has likewise often been utilized for such things as railroad ties and saddle-trees as well as for dairy, poultry, and apiary supplies. It makes ideal chopping bowls, for the more the housewife scours ~~them, the~~ whiter they become. It is therefore not surprising that the cut of American Elm in 1946 was some 200,000,000 board feet, most of it from Ohio and Wisconsin. But the days of this species seem to be numbered, for it has been struck by a devastating disease that threatens its extinction as surely as the chestnut blight has all but wiped out the American Chestnut.

The Dutch elm disease, so called because it was first described from Holland in 1921, is caused by a fungus. Our quarantine authorities thought they had every avenue of entry blocked against the Dutch elm disease, yet it broke out in the heart of the country, in Ohio, in 1930. In 1933 diseased elms were also found in New Jersey and in Connecticut, and every year brought more alarming reports of the spreading malady. The locus of infection was at last found in logs of English Elm, which were imported wholesale for the manufacture of veneer. The presence of the fungus can be detected by the shepherd's-crook curvature of the twigs, by the yellowing and falling of foliage even in spring and early summer, and in late summer and winter by the persistence of dead leaves at the tips of the branches. This disease has since spread widely, and a great many treasured elms have been lost. Evidence of its ravages can be seen scattered throughout the Catskills. The fungus that causes the disease is spread by elm bark beetles, which feed on living trees and breed in those that are dead or dying.

Úlmus rùbra Muhl. Slippery Elm.

Meaning of Species Name. Red.
Other Names. Red Elm, Moose Elm, Indian Elm, Sweet Elm, Rock Elm, Gray Elm.
Type of Plant. A small or medium-sized tree with a maximum height of 70 ft and a trunk diameter of 2 1/2 ft but usually only 40-60 ft tall with a trunk 1 to 1 1/2 ft in diameter.
Habitat. Rich (often calcareous) soil of moist woods, hills, and streams.
Range. Que and Me to Minn and ND, s to Fla and Tex.
Distr in NYS. Frequent or common across the state s of the Adirondack reg.
Distr in the Torrey Range. NY: Frequent n of the moraine on LI; on SI, then increasing and common northw, particularly in the Catskills.
Elevation. Sea level-1930 ft in the Torrey range.
Time of Fl. Mar-early May; Apr 15-May 1 at Cornell.
Origin. Native.
Remarks. Wood heavy, hard, strong, compact, durable, close-grained, dark reddish-brown; wt 43 lb per cu ft. Foliage very fragrant in drying.

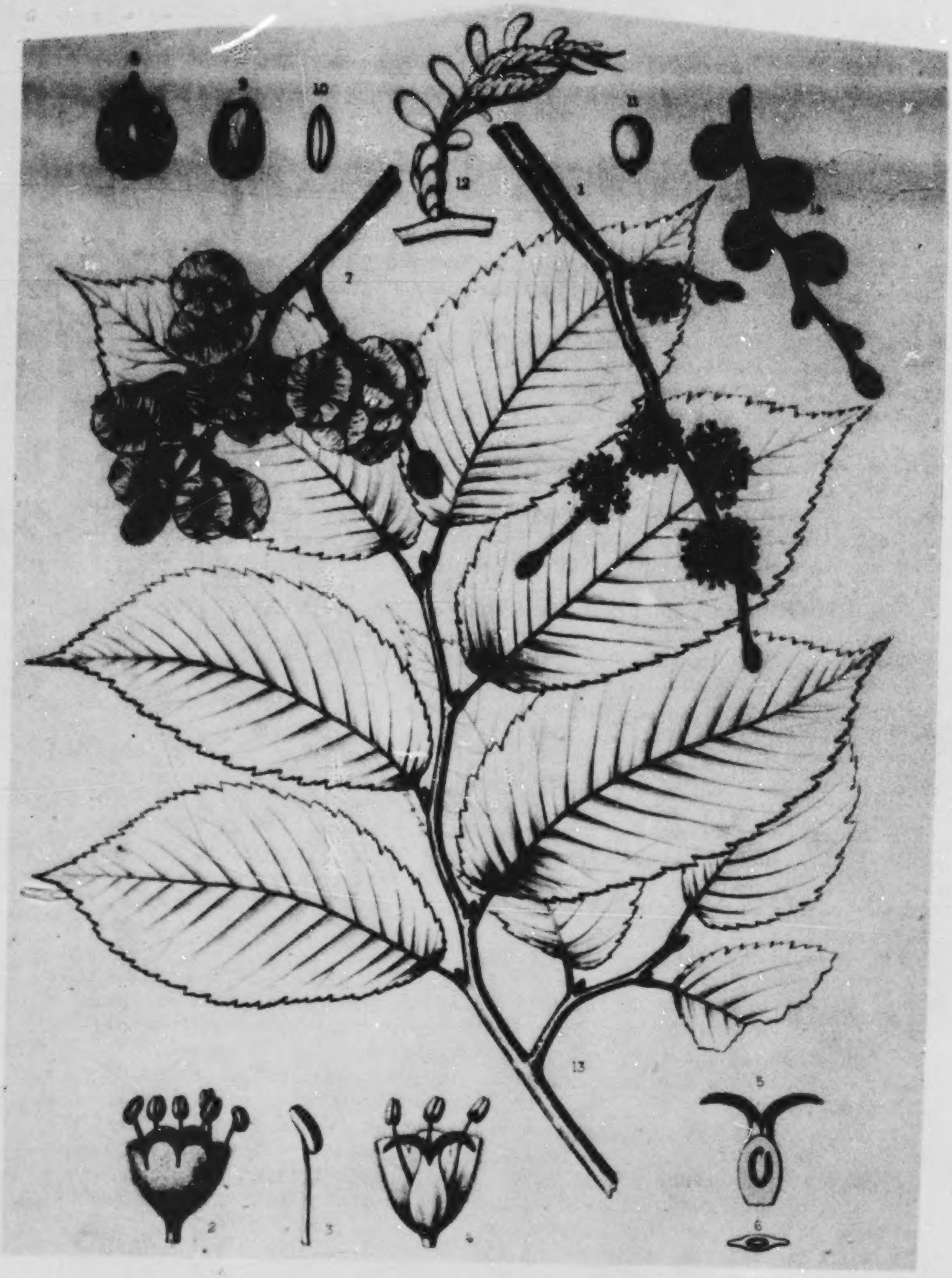
Slippery Elm is usually a medium-sized tree of bottomlands and rich, rocky slopes and ridges, growing with other hardwoods. Compared with the American Elm, there is nothing at all imposing about this tree. Hardly anyone plants it as a shade tree, nor is it ever used for reforestation purposes, but, since it attains a height of some 60 feet in a comparatively short time, there is little reason why it could not be planted for its lumber or as a shade tree. In many places it is rather rare, and there are very few areas where it could be called abundant.

How can one tell a Slippery Elm from the American Elm? The roughness of the foliage of the Slippery Elm is supposed to be one of its striking characteristics. When one crumples a leaf, its surfaces grate harshly, for they are covered with stiff hairs, but the writer often finds leaves of the American Elm almost equally harsh. The reddish or tawny pubescence on all young shoots of the Slippery Elm, and especially on the bud scales, seems to be a more reliable characteristic. In addition, a nibble of the inner bark of the twigs reveals the Slippery Elm's identity by the mucilaginous taste. No other tree in our woods has that distinctive texture except Sassafras, whose mitten-shaped leaves could never be confused with the elm's foliage.

The wood is heavy, hard, strong, coarse-grained, durable in contact with the soil, and easy to split while green. Lumbermen cut it whenever they find one big enough to make a few boards, but they never distinguish its wood from that of the American Elm. It goes to market simply as "elm lumber" and is used for much the same purposes, including fence-posts and railway ties, for window sills, wagon hubs, and agricultural implements.

The inner bark of this tree has been noted since pioneer days for its mucilaginous quality and its sweet, aromatic, and pleasing flavor, used both as a food and as a medicine. In 1714 John Lawson reported that the Indians took the root bark of Slippery Elm "and beat it, whilst green, to a Pulp, and then dry it in the Chimney, where it becomes of a reddish Colour. This they use as a Sovereign Remedy to heal a Cut or green Wound, or any thing that is not corrupted," for from it they prepared a healing salve, considering it one of the best possible poultices for wounds, bruises, boils, sores, ulcers, burns, or any inflamed surface; they found that it was not only soothing, but it also reduced pain and inflammation. Vogel (1970) reports that in 1823 John D. Hunter observed that Indians of the Ozark region used the inner bark for colds and bowel complaints, valuing its demulcent properties. Vogel also remarks that Missouri valley Indians used a decoction of the inner bark as a laxative and a preservative of meat, while the Catawbas used Slippery Elm bark in the treatment of consumption and made a salve for rheumatism by peeling the fresh bark and mixing it with lard and "bear root." The Alabamas boiled the bark in water along with gunpowder for a medicine used in delayed parturition. The Menominees used a tea of the inner bark for a physic, the Pilager Ojibwas treated sore throat with a similar tea, while another tribe used the tea to promote easy childbirth. Lighthall (n.d.) considered it a fine antidote for many poisons and stated that it was used by the Indians for that purpose.

Indians taught the white man the use of this bark not only for poultices but as a medication for use in treating fevers and diarrhea, and it soon became an important home remedy. It eventually became an official drug in the U.S. Pharmacopeia, 1820-1936, and was listed in the National Formulary, 1936-60, for its protective, demulcent, and emollient properties. During the 1800's it was also considered particularly valuable in the treatment of dysentery, irritation of the urinary tract, throat irritations, and fever. It was also mentioned as a mild laxative, but its efficacy in that respect is due solely to its lubricative and soothing qualities. Some herbalists suggested that the best way to treat colds was to make a drink by pouring a pint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Ulmus rubra--Slippery Elm
[From Sargent (1891-1902), Vol. VII, Plate 314, p. 53.]

of boiling water over 1 ounce of the coarser bark and allowing it to steep until cold, then adding the juice of 1/2 lemon and enough honey to sweeten to taste. This "elm lemonade" was also highly recommended for feverish patients, who were allowed to drink as much as they wanted, for it aided in building up the body and prevented wasting.

It was therefore considered one of the most valuable remedies in herbal practice, the abundant mucilage it contains having both strengthening and healing qualities. It not only has a most soothing action on inflamed and irritated mucous membranes, but in addition was thought to possess as much nutrition as is contained in oatmeal. Emerson (1878) reported that when made into a gruel from flour prepared by drying and grinding the inner bark and mixed with milk, like Arrowroot, it forms a wholesome and sustaining food for infants and invalids, being not only nutritive but very palatable when properly prepared. It once formed the basis of many patent foods, to which it added mucilage, starch, and calcium.

Slippery Elm food was made by mixing a heaping teaspoonful of the powdered bark into a thin, smooth paste with cold water and then pouring on a pint of boiling water, steadily stirring meanwhile. It was then sometimes flavored with cinnamon, nutmeg, or lemon rind. This made an excellent drink in cases of irritation of the mucous membrane of the stomach and intestines, and taken at night would induce sleep. Another mode of preparation was to beat up an egg with a teaspoonful of the powdered bark, pour boiling milk over it, then sweetening it. Taken three times a day, elm food gave excellent results in gastritis, gastric catarrh, mucous colitis, and enteritis, being tolerated by the stomach when all other foods failed.

Nearly all Slippery Elm recipes used the powdered bark, but it is not easy to reduce the dried bark to a powder. Gibbons (1966) used a blender after he had subjected the dried bark to a "super-drying" to make it more brittle and friable. This was done by laying the dried bark on the rack of an oven set at a very low temperature and propping the oven door slightly open so moisture could escape. He judged the bark to be done when it became so brittle that it would snap easily in two when bent. This extra-dry bark was cut into small pieces, across the grain, then fed into a blender dry while it was running at high speed. The ground bark was then put through a very fine sieve, which left him with a fine yellowish powder and the coarser material that would not pass through the sieve.

The Indians of the Missouri river valley formerly ate fresh Slippery Elm bark boiled with buffalo meat to give it a better flavor, and in times of famine both the Indians and the early settlers sometimes subsisted on boiled Slippery Elm bark alone. When boiled a long time, this bark reduced to a gelatinous mass from which the fibers are easily removed; the remaining mass is very nourishing and palatable enough so that it would be appreciated by anyone who was really hungry. According to Seton, the half-grown seeds are also edible. The fibers of the inner bark furnish lacings or cordage, and in the spring the Iroquois peeled the bark for making canoes, which were crude compared with the northern birch bark product. Dr. Darlington, as quoted by Emerson, reported that during the war of 1812 with Great Britain, soldiers on the Canadian frontier discovered that the leaves of Slippery Elm provided a nutritious food for their horses when other forage was scarce. The fresh green fruits are eaten by many birds and, according to Seton, were the favorite spring food of the now extinct passenger pigeons. The buds also are eaten by several birds, including the ruffed grouse; cottontail rabbits and deer eat the twigs, and porcupines sometimes eat the inner bark.

The *U.S. Dispensatory* of 1865 quoted Dr. C. W. Wright, of Cincinnati, who reported that "slippery elm bark has the property of preserving fatty substances from rancidity; a fact derived originally from the Indians, who prepared bears' fat by melting it with the bark, in the proportion of a drachm of the latter to a pound of the former, keeping them heated together for a few minutes, and then straining off the fat." Dr. Wright tried the same process with butter and lard and found them to remain perfectly sweet for a long time.

MORACEAE, the Mulberry Family

This is a family of about 70 genera and over 1000 species of mostly trees or shrubs, largely of pantropical distribution. The largest genus, *Ficus*, contains about 600 species spread through tropical and subtropical regions, including the common Fig, *F. carica*, of the Mediterranean region, the Banyan, *F. benghalensis*, and the India Rubber Plant, *F. elastica*, commonly cultivated for ornament. The two genera with species indigenous to the United States are *Morus* (mulberry) and *Maclura* (Osage Orange). The Mulberry family is chararacterized in part by the presence of milky latex and the usually pendulous single ovule.

Economically this family is important for the many edible fruits produced, including figs, mulberries, Breadfruit, and Jack-fruit. Genera cultivated domestically as ornamentals include the figs (*Ficus*), Fustic (*Chlorophora*), the Pickaback Plant (*Dorstenia*) and *Morus*, weeping varieties of which are popular horticultural forms. *Broussonetia papyrifera*, the Paper Mulberry, a native of Burma, China, and Polynesia, is widely cultivated in Japan, where the bark is used for papermaking. The tapa cloth of the South Sea Islands is also made from it. Several forms are cultivated for ornament in the eastern United States.

Morus L. Mulberry.

This is a genus of 12 species growing in the temperate regions of the northern hemisphere and in the mountains of the tropics, some of which have long been in cultivation, either for their fruit or their leaves, which are the food of the silkworm. They are deciduous trees or shrubs with alternate, toothed, often 3-lobed leaves and unisexual flowers. The name of the genus is the classical Latin name of the mulberry. The Black Mulberry, *M. nigra*, was cultivated by the Greeks and Romans and was introduced in northern Europe by the 9th and 10th centuries. Up to the 15th century it was extensively grown in Italy for rearing silkworms, but it has since been superseded by *M. alba*. The development of synthetic fibers and their widespread use in the textile industry, however, have greatly reduced the production of silk.

Mulberry trees are long-lived and have a habit of rejuvenating themselves, even though they may have fallen into a state of decay, for a sprout may start from a dormant bud near the base of an old tree and form a strong young stem. Trees that have blown down to expose some of the roots may also continue to grow and fruit for many years. The mulberry withstands impure atmospheric conditions better than many trees and so thrives well in cities.

The native Red or American Mulberry (*Morus rubra*), ranging from Massachusetts and southern Quebec to South Dakota, south to Florida and Texas, is the largest of the mulberries, sometimes attaining a height of 60 to 70 feet with a trunk 3 to 4 feet in diameter, but it is seldom a common tree. Its orange-yellow wood is soft, coarse-grained, and weak but very durable in contact with soil or water, making it useful for fence posts, farm tools, railroad ties, and boat-building. It has also been used for furniture and cooperage.

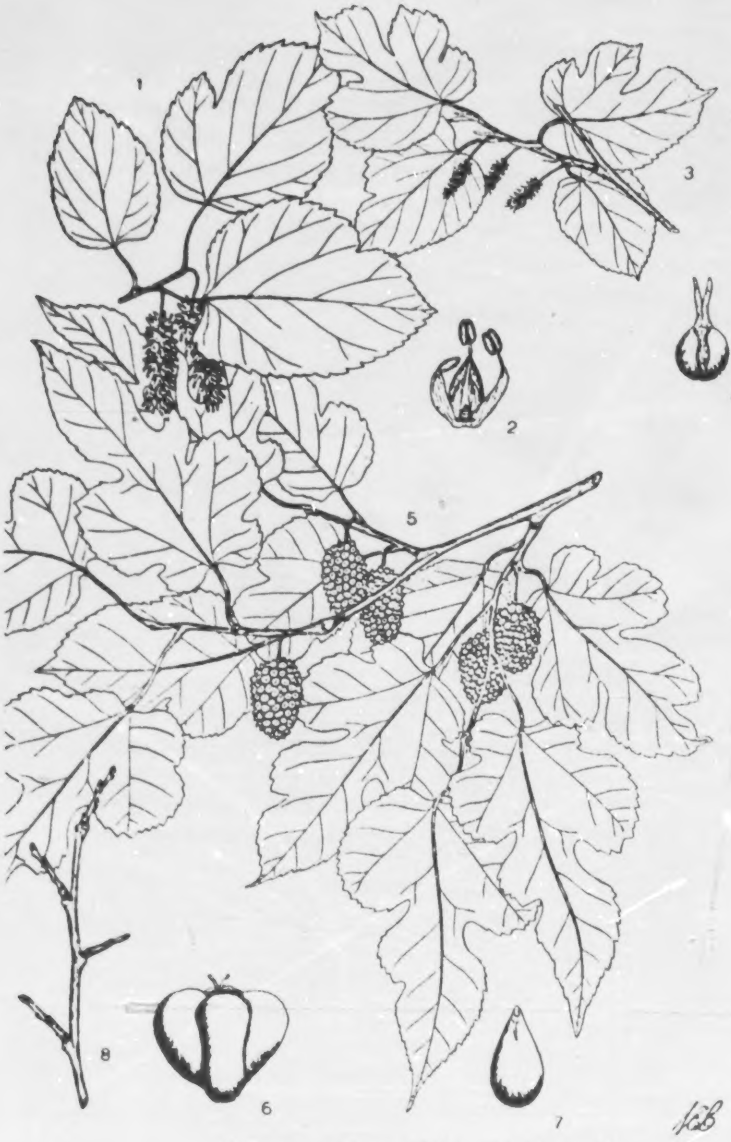
The bark of this species is fibrous like that of the elms, and the southern Indians made both rope and cloth from its fibers. The bark was stripped from the tree, dried in the sun, beaten to remove the woody part, and the resulting fibers were then bleached by exposing them to the dew. The fibers were then spun into thread and woven on a primitive loom to make a cloth from which cloaks were fashioned.

The Rappahannocks rubbed the skin with the sap of Red Mulberry to cure ringworm, but they were much more interested in its edible fruit, of which many Indian tribes made considerable use. In an earlier day the English settlers also used the fruit either fresh or for making pies, jellies, jams, marmalades, and summer drinks. The perishable nature of the mature fruit prevents its being marketed on a commercial scale, however, and some people consider it rather tasteless. Medsger (1947) disagreed, however, for he remarked that he had "never understood just why authors speak of the fruit of this tree as insipid. It is certainly among the most pleasing of all our wild fruits." It is a valuable plant if one wishes to attract birds and other small animals, for its fruit ripens over a long period of time and is relished by at least 21 different kinds of birds, including the bobwhite, robin, wood thrush, catbird, and cedar waxwing, as well as by squirrels and skunks, poultry and pigs. Its dropping fruit is a strong objection to its use as a street or lawn tree, however, and it should not be planted too close to the house if one does not wish to be awakened at dawn by the noisy chatter of birds. While this species appears to be more of a lowland than an upland tree, it would probably survive in sheltered valleys of the Catskills at lower elevations.

During the 1800's mulberries were often used in medicine. The juice extracted from the berries of *M. nigra* was the official drug, but the berries of *M. rubra* were also used. The inner bark was sometimes employed as a cathartic and to expel intestinal worms, but the juice of the berries was more commonly used to make a cooling drink to treat fevers as well as for a mild laxative.

Morus alba L. White Mulberry.

Meaning of Species Name. White.
Type of Plant. A small tree, sometimes 40 ft high, with a trunk 3 ft in diameter.
Habitat. Along roadsides, vacant lots, and open woods.



Morus alba--White Mulberry
[From Brown (1921), p. 214.]

Range. Spread from cult, especially from NY s and w.

Distr in NYS. Sparingly esc from cult and locally est.

Distr in the Torrey Range. Occasional as an esc from cult.

Time of Fl. May, fr Jul-Aug; fl May 20-Jun 10 at Cornell.

Origin. Apparently a native of e Asia; introd and natzd.

Remarks. Long cult in Eu and Am for its fiber or fruit or as food for silkworms; now used for ornament in several horticultural forms.

Two hundred years ago, when silk culture was first attempted in the United States, the White Mulberry (so called from its light-colored fruit), a native of China and Japan, was introduced into this country from Europe as food for silkworms. The various attempts at silk culture in this country proved a failure, however, chiefly because of high labor costs, but the White Mulberry has remained with us, escaping to roadsides, fencerows, and wastelands generally, being most abundant east of the Appalachian Mountains from Maine to Florida, but it has become naturalized as far west as Minnesota and Texas. The rough bark is gray, and the branches are grayish yellow. The leaves are light green, thin, ovate, sometimes lobed and divided, with coarse-toothed edges.

The fruit, which ripens from June to August, is half an inch to an inch long, white, sometimes pink-purple, not so juicy as that of the Red Mulberry, very sweet, but somewhat insipid. The so-called Russian Mulberry of the nurserymen is one of a number of horticultural races of this species. It is very resistant to cold, drought, and neglect, characteristics which have made it poplar in the Great Plains region, where it is used for low windbreaks and sheared hedges. Improved fruiting varieties have been introduced from time to time, but lack of interest in mulberries has made it difficult to obtain them from nurseries. Fruits of the naturalized trees are usually inferior and of value only as food for birds. Asiatic writers, where this species is native, speak of the cooked young shoots as "a very good vegetable."

CANNABINACEAE, the Hemp Family

This is a very small, but economically important, family of only two genera and three species of harsh aromatic herbs with palmately nerved and usually lobed or divided leaves, persistent stipules, and watery juice. By some authors Cannabis (Hemp) and Humulus (Hops) are included in the Moraceae, the Mulberry family. Recent morphological evidence, however, supports the removal of these two genera as a separate family, a decision which strengthens the distinguishing value of the milky sap as a characteristic of the Moraceae. Hops are grown for their fruits, used in the manufacture of beer, while the fibers of Hemp are much used for cordage and sacking; the drug marijuana is also obtained from Hemp.

Humulus L. Hops.

This is a genus of hardy climbing plants of the north temperate zone, often considered to include only two species but sometimes segregated into several others. They are twining, harshly scabrous plants with stems almost prickly toward the base and with mostly opposite, cordate, and palmately 3-7-lobed leaves. Hops are dioecious, that is, male and female flowers are borne in separate inflorescences. The name of the genus is a late Latin name, possibly of Teutonic origin, but some authorities think it may be derived from the Latin humus, the ground, alluding to the trailing nature of the plants. Arches, pillars, porches, verandas, and arbors provide a means of support for these plants, which make excellent screens, for they grow very rapidly.

H. japonicus, the Japanese Hop, is an annual, native to China, Japan, and Manchuria. It attains a height of 10-20 feet in one season and is a popular climbing annual for providing a screen. The variety variegatus has leaves that are streaked and splashed with white.

Humulus lupulus L. Hops.

Meaning of Species Name. An early generic name.
Other Names. Common Hop.
Type of Plant. A twining, harshly scabrous perennial herb.
Habitat. Natzd in moist soil of alluvial thickets and riverbanks; long cult and estab in waste places, fencerows, old house sites, and the like.
Range. NS to Man, Mont, and Cal, s to NC, WVa, Ky, O, Ind, Ill, Mo, Kan, Ark, Okla, NM, and Ariz; also widely distr in the old world.
Distr in the Torrey Range. Throughout the range except in s NJ.
Distr in NYS. Common or frequent in some secs of the stage, usually as an esc from cult.
Elevation. Collected above 2000 ft in Ulster co.
Time of Fl. Jul-Aug, fr Sep-Oct; fl Jul at Cornell.
Origin. Partly native, but in NYS introd from Eu.
Remarks. Yellow glands secreting the bitter lupulin occur on many parts of the plant but are most numerous on the fruit, which is an important article of commerce.

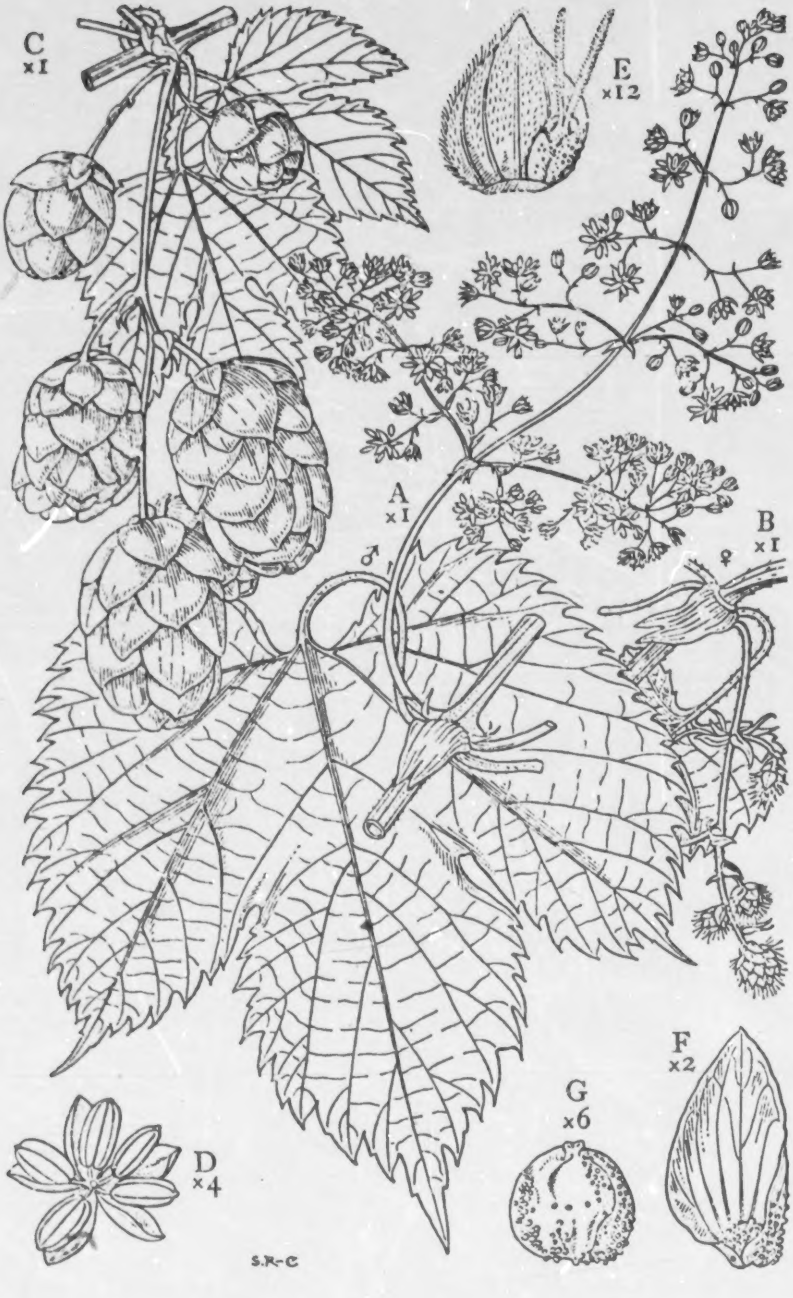
This native perennial of Europe and Asia has become naturalized in eastern North America; it is a rapid grower, often reaching a length of 20-30 feet in one season. The greenish-yellow male flowers are produced in loose axillary panicles, and the female flowers, which produce the fruits known as Hops, are on short-stalked, axillary spikes. Hops are raised chiefly for their fruit, used in brewing beer and ale, those used in brewing being horticultural varieties. The variety aureus has golden yellow leaves, useful as an ornamental climber. The species name is derived from the Latin lupus, because, as Pliny explains, when growing among osiers, "it strangles them by its light, climbing embraces, as the wolf does a sheep." The English name Hop comes from the Anglo-Saxon hoppan, to climb.

The Hop was well known to the Romans, for the use of the young shoots is mentioned by Pliny in the first century as collected from the wild plant, rather as a luxury than as a cultivated food. Gerarde says, "The buds or first sprouts which come forth in the Spring are used to be eaten in sallads; yet are they, as Pliny saith, more toothsome than nourishing, for they yield but very small nourishment." Dodoenaeus, a European herbalist writing in 1566, alludes to this plant as a kitchen herb. He says, "Before its tender shoots produce leaves, they are eaten in salads, and are a good and wholesome meat," according to Johnson (1867) "frequently eaten in the hop districts, where it is often necessary to remove some of the suckers to ensure the luxuriant growth of the remaining stems." In 1919 Hop shoots were still to be found in the Covent Garden market of London, tied up in small bundles for table use, and were not infrequently to be seen in other European markets, the young shoots being cooked and eaten as a substitute for asparagus. Only the young shoots are tasty, the older ones being bitter and tough. The "nutty" flavor is unique and to many tastes delicious, the texture being dry and slightly gritty. Chopped very fine and well dressed with butter or cream, the young shoots make a nice addition to any meal. The tender first foliage, blanched, is also a good potherb. The plant was cultivated in New Netherland as early as 1646 and in Virginia in 1648, but the first allusion to the Hop as a kitchen herb in America is by W. Cobbett in The American Gardener, published in Philadelphia in 1846.

In summing up the uses of this plant, Emil Pott, writing in 1879, stated that the tendrils furnish a good vegetable wax and a juice from which a fine reddish-brown or cinnamon dye can be extracted. Hop ashes were also greatly valued in the manufacture of certain Bohemian glasswares. A pulp for paper-making can be satisfactorily bleached, and very serviceable unbleached papers and cardboards have been made from this raw material. The fibers can also be used in the manufacture of textile fabrics, and, in Sweden, yarn and linen-making from Hop fibers was long an established industry, which, according to Sturtevant (1919), "is constantly increasing in importance and extent." The stalks can also be used for basketry and wickerwork. Johnson (1867), however, observes that while "The stems of this plant contain a large quantity of strong fibre, which may be used for cordage or textile fabrics ..., it has hitherto been little employed, jute and hemp being produced at a cheaper rate, and being superior for most purposes." The leaves and the spent hops are excellent food for livestock, especially for sheep, and oil of hops is used in the manufacture of certain types of perfume. Steyermark (1963) notes that "In some rural communities, before the common use of commercial yeast, hops were used for breadmaking," a handful being boiled in a pint of water which was then thickened with mashed potatoes and cornmeal. This mass was then flattened and cut into squares to dry to be "stored as yeast cakes ..."

The fruits of Hops have been used from the remotest period in the brewing of beer, and in central Europe their cultivation dates from about the middle of the 8th century. Hops were introduced into England from Flanders in 1524, but they were not used in brewing until 1530, during the reign of Henry VIII. Liquor prepared from fermented malt formed the favorite drink of the Saxon and Danish inhabitants of Britain, and they did not know the drink prepared with Hops. Johnson (1867) remarks that "before the use of hops, the beverage always went by the name of ale, ... brewed either from malt alone, or from a mixture of the latter with honey, and flavored, not with hops, but with heath-tops, germander, and various other bitter and aromatic herbs." Long after the introduction of Hops in England, the liquor flavored in the old manner retained the name of ale, while the word Bier or beer, of German and Dutch origin, was given only to that made with the newly introduced Hop. Gerarde, in speaking of the Hop as used "to season" beer, remarked that the people "rather make it a physical drinke to keepe the body in health, than an ordinary drinke for the quenching of our thirst."

The dried fruits were long used medicinally in the preparation of an infusion and tincture, both of which were listed as official in the 12th edition of the U.S. Dispensatory (1865). When fully ripe, the fruits were picked, dried by artificial heat, packed in bales, and sent to market under the name of Hops. The parts used medicinally include the dried strobiles and lupulin, separated from the strobiles by sifting. The latter consists of the glandular powder present on the seeds and surface of the scales of the fruit. Lupulin is an aromatic bitter reputed to be mildly sedative, inducing sleep without causing headache. Although official, preparations of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Humulus lupulus--Hops
[From Ross-Craig (1970), Part XXVII, Plate 7.]

lupulin were not much used in Great Britain, but in the United States they were considered preferable for internal use.

The bitter principle in the Hop was considered one of the most efficacious vegetable bitters obtainable. An infusion of 1/2 ounce of Hops to 1 pint of water was the quantity usually prescribed for ordinary use. It proved of great service in heart disease, fits, neuralgia, and nervous disorders, besides being a useful tonic in indigestion, dyspepsia, jaundice, and stomach and liver afflictions generally. It gave prompt ease to an irritable bladder and was said to be an excellent drink in cases of delirium tremens. The side effects described, however, were colic and constipation. An infusion of the leaves, strobiles, and stalks, as Hop tea, taken in wineglassful doses two or three times daily in early spring, was thought good for sluggish livers, and at least one physician in Mississippi reported Hops useful in the treatment of intermittent fevers, considering them inferior in antiperiodic powers only to quinine.

In writing of the medicinal use of Hops, Millspaugh (1887) stated that such use "was at first confined to their tonic, stomachic, and sedative properties; the latter was often doubted, but proved itself in many ways. During the illness of George III, in 1787, a pillow filled with hops was used instead of opiates to promote sleep; this practice is held to the present day." In Millspaugh's time, however, Hops were principally used "as a fomentation in painful swellings and suppurations, though their internal use in tincture, infusion, and powder, as an alterative, tonic, stomachic, diuretic, febrifuge, and anthelmintic is quite extensive." In addition to having a calming effect upon the nerves, they were also throught to have a sedative influence on the action of the heart.

As an external remedy, an infusion of Hops was much in demand in combination with Chamomile flowers or poppy heads as a fomentation for swellings of a painful nature, inflammation, neuralgic and rheumatic pains, bruises, boils, and gatherings; it removed pain and allayed inflammation in a very short time. A pillow of warm Hops was also often used to relieve toothache and to allay nervous irritation, and an ointment of the powder with lard was recommended as a soothing application to cancerous sores.

Although House (1924) states that Hops were "probably never indigenous in this State," there is abundant evidence that the Indians independently discovered their medicinal value. Vogel (1970) reports that Hop blossoms were used by the Mohegans to make a nerve medicine for sedation; a little bag of dried blossoms, heated, was also applied to relieve toothache and earache. The Teton Dakotas steeped the fruits to make a drink to allay fevers and intestinal pains. A part of the root was chewed and applied to wounds, alone or with other herbs. The American hop was used by the Meskwaki doctor McIntosh to cure insomnia, and the Pillager Ojibwas used it to make a tea which acted like a sodium bicarbonate on the system, increasing the excretion of urine and reducing acidity. Lighthall (n.d.) stated that Hops were "valuable in the form of a hot poultice applied to the parts affected with cramps or painful conditions. They will relieve cramps and pains of the womb, when put on the belly in a sack in a hot condition."

The dried strobiles were official in the *U.S. Pharmacopeia*, 1820-1926, and in the National Formulary to 1947. A derivative, lupuline, used as a bitter tonic, sedative, and hypnotic, was official in the U.S. Pharmacopeia, 1831-1916, and in the National Formulary, 1916-47.

URTICÀCEAE, the Nettle Family

This is a family of about 42 genera and nearly 600 species, mostly tropical and subtropical, with nearly 40 percent of its components being indigenous to the new world. Several species are widely distributed and occur in large numbers in temperate climates. The largest genus is Pilea, with about 200 mostly South American species. Four genera are represented in the Catskill flora. All species growing in the northeastern states are herbs with watery juice and greenish flowers. The family is widely distributed over the country but is less common in the southwest. Within the Urticales this family is considered to be the most highly advanced, as evidenced by the complete loss of a second carpel, the shifting of the ovule from a terminal to a basal position, and the development of the herbaceous habit from the arborescent (the latter the more characteristic of the order).

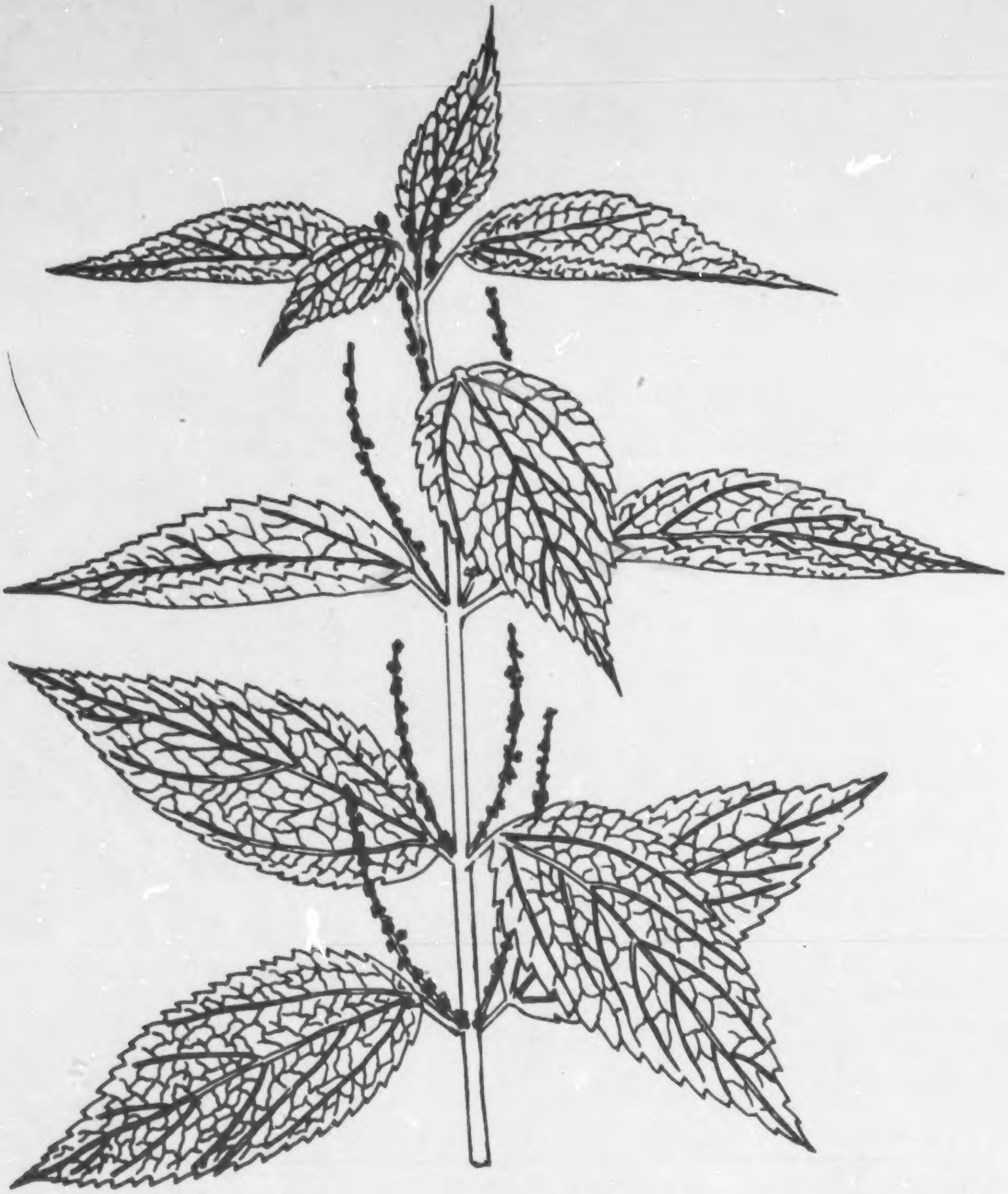
Economically the family is of little importance, although the bast fibers of many species are generally long and firmly attached end to end, and hence of considerable value for textile use in some parts of the world. Among these plants is Ramie (Boehmeria nivea), an important commercial source of fiber, particularly in the Philippines, China, and Japan. In addition, some species are grown as house plants, and the young herbage of others serves as a source of edible greens. Among the excellent window plants of this family are the Artillery Plant, the Aluminum Plant, the Panamiga, and Creeping Charlie. These members of the genus Pilea are frequently available in metropolitan florist shops.

Key to Local Genera of Urticaceae

1. Leaves alternate.. Laportea
1. Leaves opposite, 2
    2. Plant completely without hairs................................ Pilea
    2. Plant with hairs on some part of stem, leaf, flower, or fruit, 3
        3. Plants with stinging hairs; female flowers with 4 separate sepals; stigma of female flowers globe-shaped, without a forking style.. Urtica
        3. Plants lacking stinging hairs; female flowers with the sepals united into a tubular or cup-shaped calyx; style of female flowers long and threadlike with the stigmatic portion along one side.. Boehmeria

Boehmèria Jacq. False Nettle.

There are about 70 species of Boehmeria, chiefly tropical but entering the temperate zone in the United States and eastern Asia. The name of the genus commemorates Georg R. Boehmer, 1723-1803, a German scientist, professor at Wittenberg. The important fiber Ramie, or China Grass, derived from B. nivea, has been cultivated by the Chinese for many years, it being used more or less as a substitute for linen, and is still an important



Boehmeria cylindrica--False Nettle
[Redrawn from House (1923), Plate 45.]

commercial product in China, Formosa, Japan, and the Philippines. The fiber possesses some very valuable properties; it is not only much stronger than any other known fiber, but it almost equals some kinds of silk in its brilliance. In addition to successfully resisting atmospheric changes, it is easily dyed and is little affected by moisture, but because of its hairy character, articles manufactured from it do not have the same smart appearance as those made from flax.

Boehmèria cylíndrica (L.) Sw. False Nettle.

Meaning of Species Name. Cylindric, from the flower spike.
Other Names. Bog Hemp.
Type of Plant. A perennial, usually dioecious, herb.
Habitat. Moist or shady ground, chiefly in woods, openings in swamps, or in thickets, on streambanks, and borders of low woods.
Range. Que and Ont to Minn, s to Fla, Tex, and NM.
Distr in NYS. Common throughout the state.
Distr in the Torrey Range. Common throughout the range except in the pine barrens, there rare or wanting.
Elevation. Observed at 1500 ft in Greene co.
Time of Fl. Jul-Aug; Jul-Sep at Cornell.
Origin. Native.

Lapórtea Gaud. Wood Nettle.

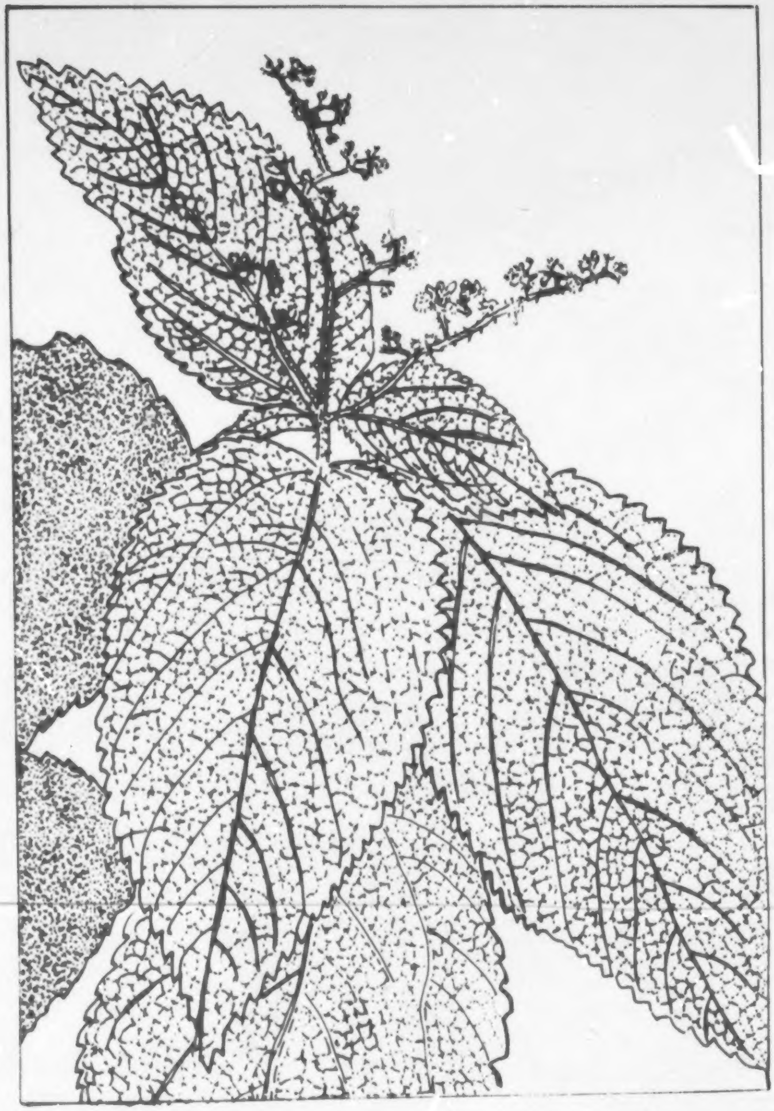
This is chiefly a tropical genus of about 75 species, mostly armed with stinging hairs. Our species, the only one in the United States, is a perennial herb with large serrate leaves and axillary stipules. The name of the genus commemorates François L. de Laporte, Count of Castelnau, 1810-1880, a French entomologist.

Lapórtea canadénsis (L.) Wedd. Wood Nettle.

Meaning of Species Name. Of Canada.
Synonyms. L. canadensis (L.) Gaud. in Gleason (1952).
Other Names. Canada Nettle, Albany-hemp.
Type of Plant. A perennial herb with us; arborescent in the tropics.
Habitat. Low or rich moist woods and banks of streams.
Range. NS to Man, s to Ga, Ala, Miss, Mo, and Okla.
Distr in NYS. Common northw; rare in the pine barrens of LI and in the higher portions of the Adirondacks.
Distr in the Torrey Range. Throughout the range except in the pine barrens, always increasing northw.
Elevation. Has been observed at 3000 ft in Delaware co.
Time of Fl. Jul-Aug; Jul-Aug at Cornell.
Origin. Native.
Remarks. There are records of the Wood Nettle having been used as a potherb.

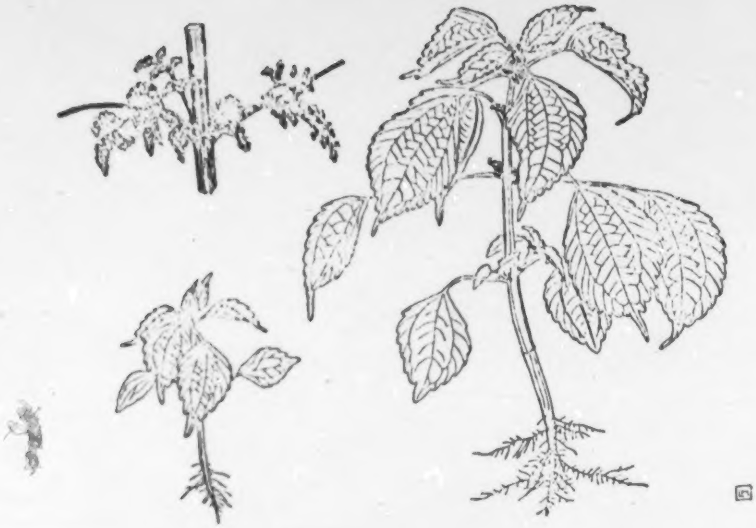
Pìlea Lindl. Clearweed.

This is chiefly a tropical genus, with about 500 described species. They are stingless, mostly glabrous and low North American and tropical herbs with united stipules, the staminate flowers often mixed with the pistillate ones. The name of the genus is derived from the Latin pileus, a felt cap, referring to the enlarged sepal covering the seed in certain species. On dried specimens the numerous cystoliths often appear as minute whitish lines on the surface of the leaf.



Laportea canadensis--Wood Nettle
[Redrawn from Fyles (1920), Plate 10, p. 29.]

This genus contains several ornamental foliage plants from tropical America, Jamaica, China, and Indo-China, several of which make excellent window plants. P. microphylla, the Artillery Plant, grows 4-8 inches high and forms a mass of fernlike foliage. The common name refers to the fact that the unexpanded flower buds, when moistened, forcibly discharge their pollen in a visible dustlike cloud. P. cadierei, the Watermelon Pilea or Aluminum Plant, a native of Indo-China discovered in 1928, was introduced to the United States from Europe in 1952. It grows a foot or 18 inches high and has ovate green leaves handsomely marked with silver on the upper surface. The Panamiga, P. involucrata, a native of South America, grows only a few inches high, but the leaves have deeply indented veins that provide a pleasing pattern. Creeping Charlie, P. nummulariaefolia, is a native of the



Pilea pumila--Clearweed
[From Fogg (1945), p. 63.]

West Indies that forms a tight, ground-hugging mass of nearly circular, light green leaves. It makes a good low ground cover for use in greenhouses and conservatories and also forms a handsome specimen when grown in hanging baskets.

Pilea pumila (L.) Gray. Clearweed.

Meaning of Species Name. Dwarf.
Other Names. Richweed, Coolweed, Stingless Nettle.
Type of Plant. An annual herb.
Habitat. Cool, moist, rich shaded places of swamps, low woods, or moist rocks.
Range. Que to Minn, s to Fla, La, Okla, Ia, and SD; also in Japan.
Distr in NYS. Common in most secs of the state but absent from the pine barrens of LI.
Distr in the Torrey Range. Throughout the range except in the pine barrens of NJ and LI, there rare or wanting.
Elevation. Grows to 3000 ft in Va; collected above 2000 ft in Ulster co.
Time of Fl. Jul-Sep; Jul-Sep at Cornell.
Origin. Native.

Steyermark (1963) states that the translucent stems of this species are often used in biology experiments "to demonstrate the passage of liquids upward from the lower part of the stem to the petioles and leaf-blades." The red liquid usually used "is clearly visible through the plant's watery cells." It has been also been remarked that this plant may be an available potherb, a suggestion evidently based on this use of some tropical species, but Steyermark observes that "no records indicate its definite use for such purposes."

Urtica L. Nettle.

This genus contains about 50 species found in the temperate parts of both hemispheres. They are herbs bearing stinging hairs and have small greenish, unisexual flowers. A unisexual flower bears either stamens, producing the pollen, or a pistil, containing the ovary within which the seed (or seeds) develops. When unisexual flowers are borne on different parts of the same plant, it is said to be monoecious; when male flowers only occur on one plant while the female flowers are borne on a different one, the plant is dioecious, and both types occur in this genus. The stinging hairs consist of an elongated tubular cell, the end of which is extremely sharp-pointed. When this point pierces the skin, it breaks off, and the fluid in the cell, which in this case contains formic acid, drains out, producing a temporary irritation. The name of the genus is the classical Latin name of the nettle, derived from uro, to burn.

There has been some disagreement among botanists as to the relationship of some of the taxa in this genus, particularly with respect to what the botany manuals call U. dioica, a European plant, and U. gracilis, a native of North America. The former is characterized by thin, ovate, sharply toothed leaves, the upper and lower leaf surfaces and the internodes bearing numerous bristles 0.75-2 mm long in addition to the stinging hairs; the plant is dioecious, with the inflorescence diffusely branched and more or less setose. U. gracilis, on the other hand, has firm, ovate-lanceolate to lanceolate leaves less sharply toothed; the plant is usually monoecious, with the upper verticels pistillate and the lower ones staminate, and the inflorescence is less diffusely branched and not setose. Current opinion among many botanists is that these differences are not great enough to warrant separating them into two distinct species; they have therefore been reduced to subspecies, the European one now being called U. dioica ssp. dioica while our native plant is U. dioica ssp. gracilis. The two plants are so similar that only a botanist is likely to be concerned with the differences, but for the record it may be of interest to point out that only the native plant has so far been collected in the Catskills; the introduced European plant seems to be restricted to areas near the larger centers of population, where it occurs sporadically. Since our plant is so similar to the European one, however, whatever is said concerning the uses of that plant could equally be applied to ours.

The European plant supplied the fiber used in former times by the Germanic and Scandinavian nations before the introduction of flax. Its fiber is similar to that of flax and was used for the same purposes, from making cloth of the finest texture down to the coarsest, such as sailcloth, sacking, and cordage. Nettle fibers were still used in Scotland during the 16th and 17th centuries for weaving household napery, considered by many to be superior to linen. Even as late as 1832 one authority stated that twine made from nettle fibers was particularly useful for making fishing nets, it being stronger than flax and not so harsh as hemp. Johnson (1867) quotes Campbell as saying, "In Scotland I have eaten Nettles; I have slept in Nettle sheets, and I have dined off a Nettle table-cloth.... The stalks of the old Nettle are as good as flax for making cloth. I have heard my mother say, that she thought Nettle cloth more durable than any other species of linen." Nettle fiber is "somewhat more difficult of extraction" than is that from flax, but according to Johnson, "The greatest objection to its extensive employment in this country, is the necessity of growing it in rich deep soil, for otherwise the fibre produced is short and coarse; and on land fitted for it, flax can be grown at less cost, compared to the value of the seed and fibre yielded."

While its use was discontinued in the British Isles because raising flax was more economical, it continued to be used in other countries for many years, even as late as 1918. When Germany and Austria ran short of cotton during World War I, 2.7 million kilograms of nettles were collected from plants growing wild for use in the manufacture of cloth, stockings, tarpaulins, and the like. It soon became evident that wild nettles could not supply current needs and in 1917 some 70,000 hectares (nearly 173,000 acres) of nettles were cultivated. By-products of the nettle industry were then also indispensable in supplying such items as sugar, starch, and ethyl alcohol. In France nettle fibers have been used in the manufacture of paper of various qualities, but their experiments did not always meet with complete success.

In Sweden and Russia nettles were at one time not only considered of value as fodder for livestock but were sometimes cultivated as such, being mown several times a year and given to milch cattle. The drying process destroys the formic acid in the stinging hairs and cows were thought to give more milk when nettles were added to their diet than when fed on hay alone. During World War I, German military authorities issued instructions for the use of nettles as a substitute for fodder. Dried and finely chopped nettles have also been added to poultry feed to increase egg production.

A greenish-yellow dye for wool was extracted from this plant in colonial times by chopping the whole plant except the roots and boiling for an hour, after which the liquid was strained. One pound of wetted wool, mordanted with alum, was then put into 4 to 4 1/2 gallons of lukewarm dye bath and simmered for 30 minutes, after which it was rinsed and dried. The amount of nettles to gather was not specified, but most recipes of the period used a peck of plant materials from which to extract the dye. The roots, boiled with alum, also produced a yellow color formerly widely used in the country districts of Great Britain.

Urtica dioica L. ssp. grácilis (Ait.) Sel. Stinging Nettle

Meaning of Species Name. Dioecious; ssp. name, slender.

Synonyms. U. gracilis Ait. in Fernald (1950), U. dioica L. var. procera Wedd. in Gleason (1952).

Other Names. Slender Nettle, Tall Wild Nettle, Tall Nettle.

Type of Plant. A mostly monoecious perennial, reproducing by seeds and creeping rootstocks.

Habitat. Along fencerows, borders of woods, and damp woodland openings, barnyards, waste places, and neglected fields, particularly in rich damp loamy soils.

Range. Nf to Ak, s to NY, WVa, Minn, NM, and Ore.

Distr in NYS. Common throughout the state except on LI, where it is reported as rare.

Distr in the Torrey Range. NY: Not common on LI and SI, becoming frequent in Westchester co, thence increasing and becoming common northw.

Elevation. Sea level-1950 ft in the Torrey range.
Time of Fl. Jul-Sep; Jul-Aug at Cornell.
Origin. Native.

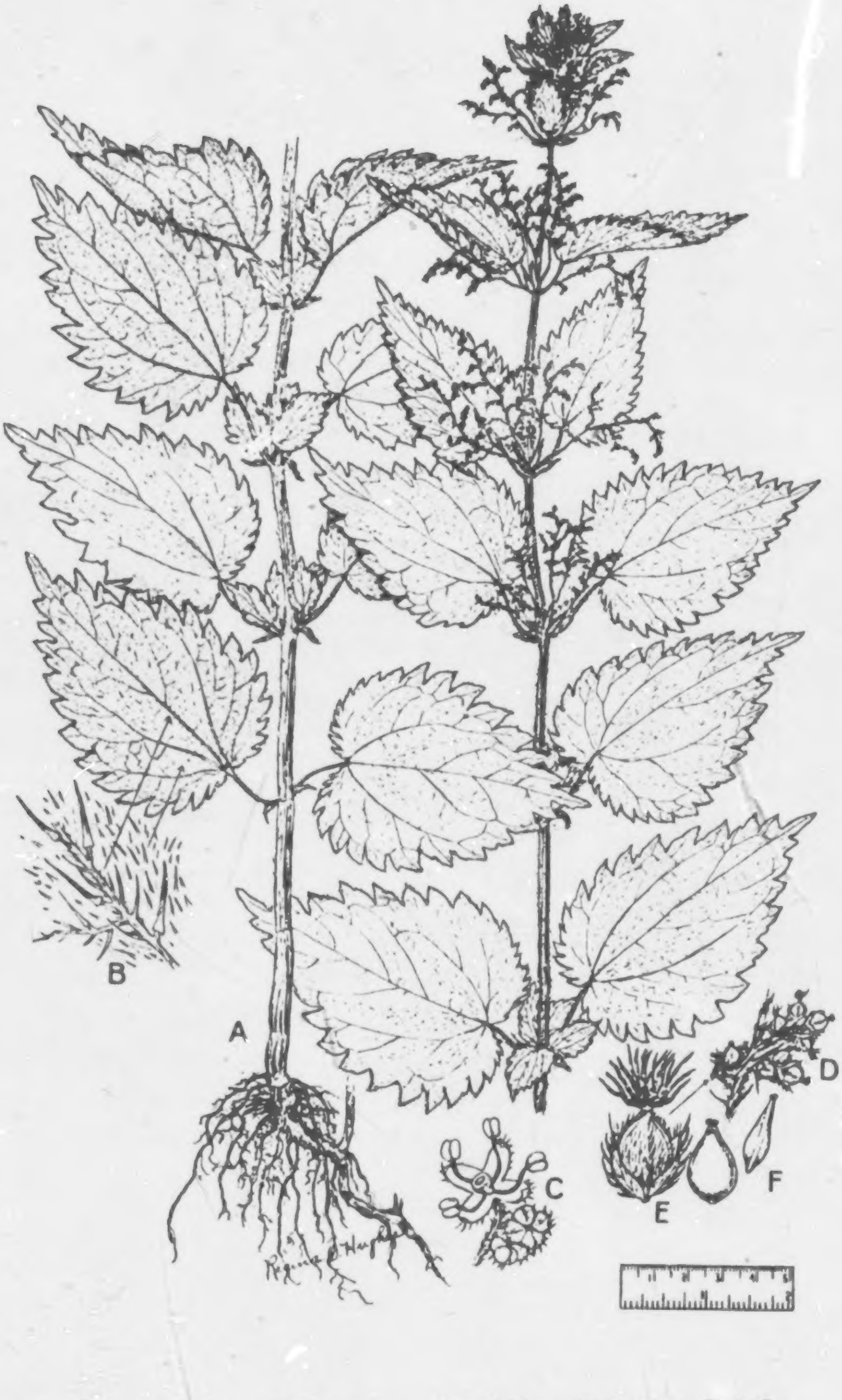
In many parts of the world the nettle is considered one of the finest and most nutritious of foods, a far better vegetable than many of those so laboriously cultivated in the farmer's garden (its stinging properties are lost during the process of cooking). Nettle greens are easy of digestion and rich not only in vitamins A and C but in protein and in many essential trace minerals as well. They never found great favor in England but are much used in many parts of Europe. Even the Indians were aware that nettles could be eaten, for one authority reported that they sometimes prepared a nettle stew from the pinkish shoots that grow below the surface "by boiling 2 cups of the young shoots in 1/2 cup of water to which was added 1/2 cup of red ants and about 2 dozen minnows, heads and all," but the suggestions given below will probably be more appealing to most people.

The young tops are gathered in spring when they are 6 to 8 inches high; later in the season they become unpalatable, for the leaves become gritty from the abundance of crystals (cystoliths) they contain. After washing them in running water, using a long-handled spoon to stir them, transfer them to a saucepan, dripping, without any added water, and cook covered for 15 to 20 minutes. These greens, by some thought to resemble bean sprouts in flavor and texture, should not be overcooked. After being drained (save the juice), chopped, and seasoned to taste with salt, pepper, and butter, they are ready to serve, but they can be creamed if desired by adding 1 can of cream of mushroom soup and 1/2 cup of light cream to 2 cups of cooked, chopped greens. Nettle greens can likewise be substituted for Spinach in any recipe using that vegetable.

Nettle greens also make a good soup, and in Scotland they are cooked with leeks, broccoli, and rice to make a nettle pudding, considered a very palatable dish. The soup is prepared by using 2 quarts of stock from chicken, turkey, or veal, to which is added about a pound of young nettle tops which have previously been blanched in a frying pan with a little butter. Add 2 or 3 small sausages, previously fried and cut up in small lengths, to the soup and continue cooking until the nettles are done, then stir in a little sour cream just before serving.

The juice drained from the cooked nettles has been used as a substitute for rennet to coagulate milk by adding to it as much salt as it will absorb. Nettle junket can be made by heating 1 pint of milk until it is just lukewarm and adding 2 tablespoons of sugar, 1/2 teaspoon of vanilla, and 1 teaspoon of the salted nettle juice. After stirring, pour into serving dishes and chill.

Nettles also once enjoyed a high reputation in medicine, the leaves, seeds, and roots being listed as official in the pharmacopeas of Great Britain, Scotland, and the United States during the first half of the 19th century for use as an astringent and as a stimulating tonic. The nettle was felt to have few equals as a blood coagulant, and an infusion of the dried herb or an alcoholic tincture made from the fresh plant, even fresh nettle juice itself, was given internally to stop bleeding from the nose, lungs, or stomach. Old herbals also suggested putting a small piece of cotton moistened



Urtica dioica ssp. gracilis--Stinging Nettle
[From USDA Agr. Research Sv. (1971), Fig. 53, p. 111.]

with nettle juice into the nostrils to check nosebleed, and burns were treated by covering them with linen bandages kept well wetted with the tincture. It was also considered an excellent antiscorbutic for the treatment of scurvy, which indeed it was. In addition, a nettle beer was often prescribed as a remedy for gouty and rheumatic pains, apart from its being considered a pleasant drink in its own right. Some Indian tribes likewise made medicinal use of this plant, for Densmore (1928) states that the Chippewas employed a decoction of the root of this plant, taken internally, in the treatment of dysentery. Combined with the root of Lady Fern (Athyrium filix-femina), it was also prescribed for stoppage of urine.

Nettles also have antiasthmatic properties and the juice of the roots or leaves, mixed with honey or sugar, was prescribed for bronchial and asthmatic troubles. Even smoke from the dried leaves was inhaled for the same effect. The powdered seeds were considered a cure for goiter and helpful in reducing weight, and the seeds and flowers, given in wine, were used as a remedy for ague. The stinging hairs on the fresh plant were sometimes used as a counterirritant in the treatment of torpor, local palsy, and rheumatism, "the part being beaten with it till the requisite degree of action is produced." Counterirritants are still used in the treatment of rheumatic pains, and possibly the formic acid in the stinging hairs may have had a curative effect.

Where this species has become an undesirable weed, Muenscher (1952) suggests that it can be controlled by mowing close to the ground to prevent seed formation; in small areas, grub out the rootstocks and kill by drying. The plants can also be killed outright, without touching the nettles, by spraying the young shoots with a weed killer.

SANTALÀLES

This order consists of six or eight families of chiefly tropical plants, only two of which occur in the Catskills. The relationship of this to other orders of plants is still in question, and it may belong with the Sapindales rather than with the apetalous orders with which it is here associated, although some authors feel it is closely allied to the Proteales.

LORANTHÀCEAE, the Mistletoe Family

This is primarily a tropical family of about 30 genera and 1100 or more species, but one which extends into the temperate zones of both hemispheres. It is represented in the United States by 2 genera: the scaly-leaved Arceuthobium, a primarily American genus of about 12 species parasitic on numerous genera, and by Phoradendron, a genus of about 300 primarily tropical species of woody parasitic plants. Economically the family is domestically important only as the source of the mistletoe of yuletide popularity. The mistletoe sold commercially in the United States is Phoradendron flavescens, a plant similar to the European Mistletoe, our plant occurring on deciduous trees from central New Jersey to Missouri, south to Florida, Texas, and New Mexico. The European Mistletoe of folklore and literature is Viscum album. Some species become so abundant as to endanger the trees on which they live.

In England V. album is most abundant on apple trees, poplars, willows, mountain ash, and maples, occasionally on oaks. The fruit is eaten by most frugiverous birds; they inadvertently sow the seeds by wiping their beaks, to which the seeds adhere, against the bark of the trees on which they have alighted. The viscid pulp soon hardens, affording protection to the seed. In germination the sucker root penetrates the bark and establishes a connection with the vascular tissue of the host. The plant is slow in growth but is very persistent, its death being determined generally by that of the tree on which it has established itself.

Pliny is the authority for the statement that the mistletoe was held in reverence by the Druids. Prepared as a draught, it was used as a supposed cure for sterility and a remedy for poisons. The mistletoe figures also in Scandinavian legend as having supplied material for the arrow with which Balder, the sun god, was slain by the blind god Hoeder.

Arceuthòbium Bieb. Mistletoe.

There are about 10 species of Arceuthobium, all parasitic on conifers of the northern hemisphere. These usually small plants are glabrous, with rectangular branches and connate scalelike leaves. The name of the genus is derived from the Greek arceuthos, juniper, and bios, life, the plants being parasitic on Juniperus and related trees.

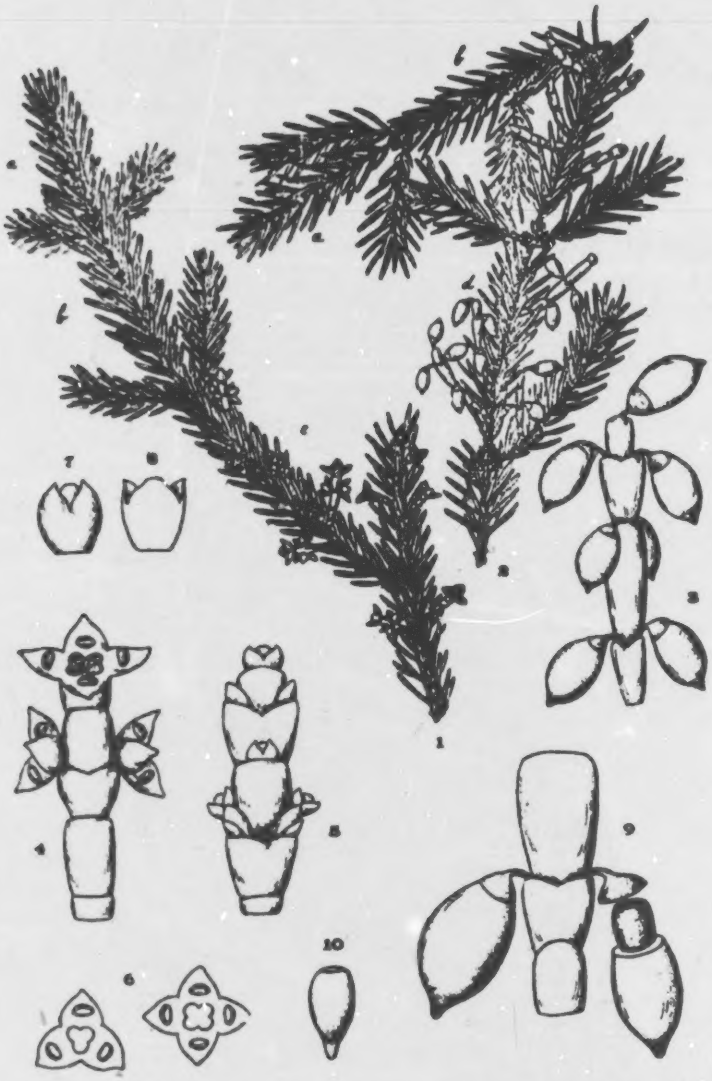
Arceuthòbium pusíllum Peck. Dwarf Mistletoe.

Meaning of Species Name. Tiny.
Other Names. Small Mistletoe, Witches' Broom.
Type of Plant. A parasitic herb.
Habitat. Parasitic on branches of spruce (usually P. nigra, rarely P. rubens), more rarely on Larch and White Pine, in swamps and bogs.
Range. Nf and Que to Ont and Minn, s to NJ, Pa, Mich, and Wis.
Distr in NYS. Frequent across the state northw; less common, rare, or local southw to Sullivan co and westw to Monroe co.
Distr in the Torrey Range. NY: Mountain summits of Greene co.
Time of Fl. Jun-Jul
Origin. Native.
Remarks. Usually a single host tree supports only one sex of this plant; it often causes "witches'brooms," particularly on spruce.

There are no specimens of this plant from the Catskills in the herbaria at the New York State Museum in Albany, at the New York Botanical Garden, or at the Brooklyn Botanic Garden, nor has the writer seen it in the field. It is included here on the authority of Taylor (1915), who states that it occurs in the Catskills.

SANTALÀCEAE, the Sandalwood Family

This is a family of about 26 genera and some 420 species of semiparasitic trees, shrubs, and herbs, most numerous in the southern hemisphere and in the tropics. Actually, the number of species as recognized by various

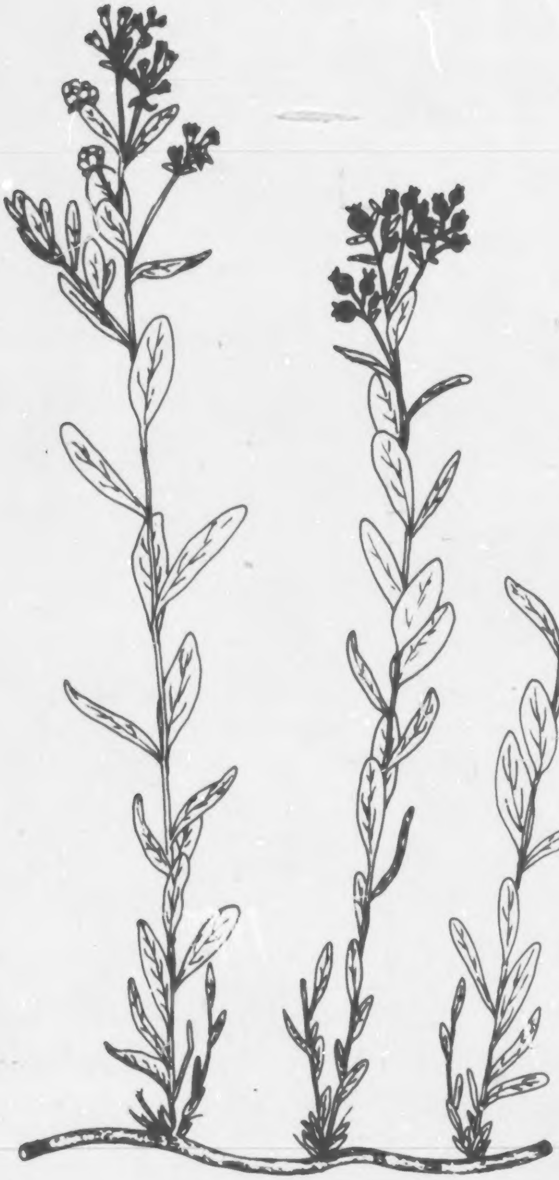


Arceuthobium pusullum--Dwarf Mistletoe
[From Rhodora (1900), Vol. 2, Plate 13.]

authorities ranges from 250 to 600. The family is represented in the United States by 4 genera, only 1 of which occurs in the Catskills.

Economically the family is of little domestic importance, as only *Buckleya* and *Pyrularia*, the Oil-nut or Buffalo-nut, are cultivated (infrequently) as novelties. In the tropics and subtropics, the aromatic and sweet-scented Sandalwood, *Santalum album*, a native of India, is prized for cabinet-making and for use in perfumery. The sweet fruit of some genera is edible.

The use of Sandalwood dates as far back at least as the 5th century B.C. It is still extensively used in India and China, wherever Buddhism prevails, being employed in funeral rites and religious ceremonies. In India it



Comandra umbellata--Bastard Toadflax
[Redrawn from House (1923), Plate 28B.]

is also used in the manufacture of boxes, fans, and other ornamental articles of inlaid work. The oil, obtained by distilling the chipped wood, is used as a perfume, few native Indian attars or essential oils being free from admixture with it. As a powder or paste the wood is employed in the pigments used by the Brahmans for their distinguishing caste marks.

Comándra Nutt. Bastard Toadflax.

These are smooth, sometimes parasitic plants of North America and southeastern Europe with creeping rootstocks, erect simple herbaceous flowering stems with alternate sessile or subsessile leaves, and terminal corymbs or panicles of whitish flowers. There are six species, including one in Europe and two in the western states. The name of the genus is derived from the Greek *kome*, hair, and *aner*, man, in allusion to the tuft of hairs attached to the anthers.

Comándra umbellàta (L.) Nutt. Bastard Toadflax.

Meaning of Species Name. Bearing umbels.
Type of Plant. A perennial herb; a root parasite, according to Peterson and McKenney (1968).
Habitat. Dry sterile or acid ground of sandy fields and thickets, more rarely in marly bogs.
Range. Me to Ont and Mich, s to SC, Ga, Ky, and Ala.
Distr in NYS. Locally common across the state s of the Adirondack reg and frequent or common on LI and SI.
Distr in the Torrey Range. Throughout the range.
Elevation. Has been collected at 2500 ft in Ulster co.
Time of Fl. May-Jul; May 10-Jun at Cornell.
Origin. Native.

The little urn-shaped nuts of western species of Bastard Toadflax have been popular with the Indians on account of their sweet taste. In our eastern species the fully grown but hardly ripe nuts are sweet and oily, a delicious nibble, but rarely found in sufficient quantity for more than a pleasant tidbit in the field.

ARISTOLOCHIÀLES

This order consists of herbs and woody plants, some of which are parasitic. It was treated by Engler as composed of three families, only one of which occurs in the Catskills; the other two are small families occurring in the tropic and south temperate zones. Undoubtedly this order is more advanced than the Engler system indicated and its apparent simplicity is one of reduction. The views of Hutchinson and Wettstein (that it has descended from ranalian or magnoliaceous ancestral stocks) are the more widely accepted. In any case, botanists are generally agreed that this order is not in any way related to those preceding and following.

ARISTOLOCHIÀCEAE, the Birthwort Family

This is primarily a small tropical family of bitter-tonic or stimulant, sometimes aromatic, perennial herbs with a few members throughout most temperate regions, composed of about 7 genera and some 400 species. The bizarre flowers of some species of *Aristolochia* are of huge size, usually purple-brown in color and often of fetid odor, pollinated by carrion-eating flies. Some of these are occasionally seen in cultivation. *Aristolochia* clematis, Birthwort, a native of southern Europe once thought to possess medicinal virtues, occasionally escapes from cultivation from New York to Maryland and Ohio.

Economically the family is of little importance. Aristolochia durior, Dutchman's Pipe, is a vigorous, high-climbing woody vine widely planted in Europe and the United States as a porch vine for shade and for the decorative effect of its large leaves. A. serpentaria, Virginia Snakeroot, is valued medicinally for its aromatic-stimulant root. Some species from Jamaica, Guatemala, West Africa, Brazil, and other tropical countries, are suitable for growing in greenhouses.

Ásarum L. Wild Ginger.

This is a genus of some 60 hardy perennial plants of the north temperate and tropical zones, chiefly of eastern and southeastern Asia; about nine other species occur in the United States, three of which are native to the Pacific states. All have aromatic-pungent rhizomes. The name of the genus comes from the Greek asaron, the Greek name of A. europaeum, Asarabacca, a low, stemless perennial plant formerly grown for medicinal purposes, the underground stem having cathartic and emetic properties. This genus possesses little floral beauty but some of the species are useful as edging plants in a shaded border or in a woodland garden. A. europaeum makes a fine evergreen ground cover. One species is cultivated in England, where at one time it was considered a remedy for headache and deafness.

Ásarum canadénse L. Wild Ginger.

Meaning of Species Name. Of Canada.
Other names. Indian Ginger, Canada Snakeroot, False Coltsfoot, Colicroot, Heart Snakeroot, Vermont Snakeroot, Southern Snakeroot, Asarabacca.
Type of Plant. A perennial herb.
Habitat. Rich woods and shaded calcareous ledges.
Range. Que and NB to Ont and Minn, s to NC, Ky, Ala, and Ark.
Distr in NYS. Common throughout the state except southwestw, where rare; reported from but not recently collected on LI.
Distr in the Torrey Range. NY: Reported, but not definitely known from LI, increasing and common northw up the Hudson valley.
Elevation. Grows to 3000 ft in Va; sea level-3200 ft in the Torrey range.
Time of Fl. Apr-May; Apr-May at Cornell.
Origin. Native.
Remarks. Usually grows in colonies.

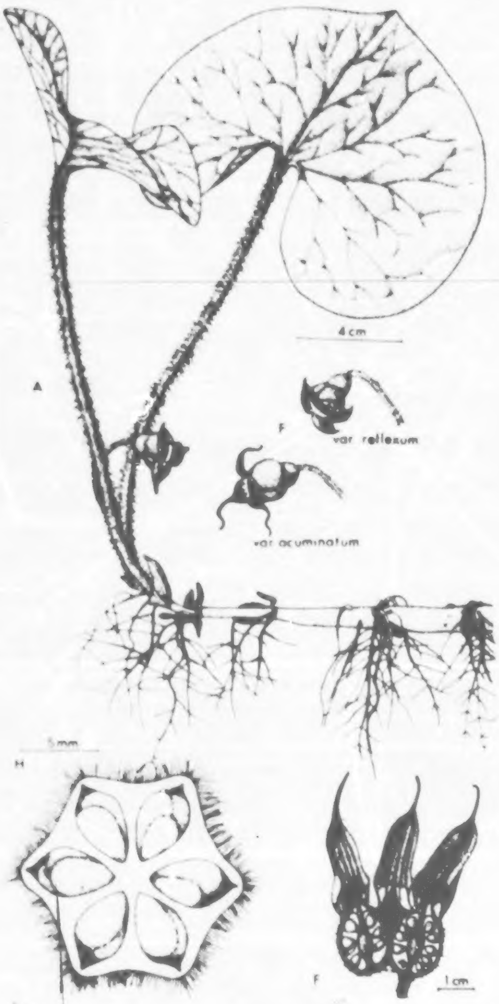
Wild Ginger is not related to the plant that produces the ginger of commerce, but the long rootstocks have a similar taste and odor. In the field it makes an agreeable nibble, but eating too much may make one ill. The early settlers used to dry the root and grate it as a substitute for the commercial product. Barton, writing in 1818, stated that the dried, pulverized root was commonly used in many parts of our country as a substitute for ginger, and Balfour, in 1875, remarked that it was used as a spice in Canada. The rootstocks can be collected any time during spring or summer.

A delicious, pungent substitute for preserved ginger can be prepared by keeping the roots, which have been well scrubbed and cut into convenient lengths, barely covered with water and simmering for an hour or so until tender. (One old recipe suggested boiling them 15 minutes a day for 3 days and allowing them to cool between boilings, candying them on the fourth day.) For each cup of ginger root add 1 cup of sugar, boil another half hour, then drain. After drying for a day or two, roll the roots in granulated sugar and store in tight jars to use as wanted. The syrup can also be bottled, for both products have their uses. Nibbling a piece of candied Wild Ginger after a meal is said to promote digestion and prevent the formation of distressing gases. One might also stir 1 tablespoonful of the syrup in a glass of water to drink after meals for the same effect.

Wild Ginger was one of the native herbs much used in Indian medicine. In 1823 John D. Hunter reported that Indian women west of the Mississippi esteemed its root as an emmenagogue (an agent that promotes menstrual discharge); it was also sometimes taken as an abortive, and, boiled in a small amount of water for a long time, the resulting decoction was taken as a contraceptive. Some tribes also applied it externally to recent wounds to prevent bleeding. Vogel (1970) reports that the Montagnais used Wild Ginger for general medicinal purposes, while the Catawbas used the related A. arifolium for heart pains. The Menominis, Potawatomis, and Meskwakis regarded the root as a seasoner to make food palatable and safe to eat. The Meskwakis also used it for throat trouble, earache, and sore ears, and in combination with other herbs for lung trouble as well as stomach cramps. Densmore (1928) reports that the Chippewas also made medicinal use of this plant in addition to regarding the root as an "appetizer," putting it in any food as it was being cooked. They treated inflammation by chopping up equal parts of the rhizome of this plant and the roots of Plantago major, which were spread on a fresh plantain leaf and applied as a poultice. This preparation was often made beforehand "and kept in a wrapping of leather." Fractures were treated by making a poultice of equal parts of the rhizome of Wild Ginger and the roots of Aralia racemosa. "If the arm is very sore and the poultice has become dry the poultice may be moistened with warm water before removing."

The early settlers not only learned some medicinal uses of Wild Ginger from the Indians but also found additional applications for it. In his Collections for an Essay towards a Materia Medica of the United States, the 3rd edition of which was published in Philadelphia in 1810, Dr. Benjamin S. Barton classified the root and leaves of this plant as powerful emetics. In 1849 Dr. Stephen W. Williams of Massachusetts called the root a warm stimulant similar to Virginia Snakeroot; he believed it to be useful in low stages of fevers, nervous affections, and palpitations. He also stated that a snuff made from the powdered root was useful in disorders of the head and eyes and that it was used for many complaints by Canadian Indians. When a party of them visited him at Deerfield in 1837, they were offended when he declined to accept a preparation of ginger root for palpitation of the heart with which he was then afflicted.

During much of the 19th century the dried rhizome of this plant was used medicinally as a stimulant, carminative, diuretic, and diaphoretic in the treatment of chronic chest complaints, dropsy with albuminaria, and painful spasms of the bowels and stomach. It was listed in the 12th edition of



Asarum canadense--Wild Ginger
[From Mitchell & Beal (1979), p. 17.]

the U.S. Dispensatory (1865) as "an aromatic stimulant tonic, with diaphoretic properties." The roots of the plant were dried and, when needed, prepared by adding a teaspoonful of the granulated root to a pint of boiling water. Of this mixture, 2 tablespoonsful were taken at a time as long as required. One doctor of Indiana found it to possess diuretic properties and used it "with extraordinary success in two cases of dropsy connected with albuminous urine." The editors of that edition also stated that it "would form an elegant adjuvant to tonic infusions and decoctions." This plant was also once used as a remedy for whooping cough.

The dried rhizomes of Asarum canadense were official in the U.S. Pharmacopoeia, 1820-73, and in the National Formulary, 1916-47. They have been used as an aromatic stimulant, carminative, tonic, and diaphoretic. Dr. Edward P. Clause reported in 1961 that two antibiotic substances have been isolated from this drug, one of which is "very active against Gram-positive, pus-forming bacteria." In spite of the fact that preparations of this plant are no longer official, the dried rhizomes are still in demand by a number of drug companies.

Steyermark (1963) remarks that "some persons are reported to be affected by a dermatitis after having touched the leaves."

POLYGONÀLES

This, the last order of the Catskill Apetalae, contains only one family, the Polygonaceae, or the Buckwheat Family. This order is related to the Caryophyllales, which usually follows next in botany manuals, for many botanists regard this order as having evolved from caryophyllaceous stocks, over which it seems to be phyletically more advanced.

POLYGONÀCEAE, the Buckwheat Family

This family comprises about 32 genera and 800 or more species, chiefly of temperate distribution, primarily in the northern hemisphere. They are mostly herbs (some of which are twining climbers), sometimes shrubs (more rarely trees), characterized by the union of the stipules at the joints of the stem into a sheath or ocrea (sometimes obsolete), which protects the younger leaves in the bud stage.

The leaves are alternate, simple, and generally entire, with the edges rolled back in the bud. The small, regular, generally perfect flowers are borne in large numbers in compound inflorescences. In some species the flowers are wind-pollinated, as in the docks (Rumex), the flowers of which have large hairy stigmas; in others, as in the smartweeds (Polygonum) and Rhubarb (Rheum), the stigmas are capitate and honey is secreted by glands near the base of the stamens to attract insects. In other cases self-pollination is the rule, as with Knotgrass (Polygonum arenastrum), where the small solitary flowers are odorless.

This is not an important family from an economic standpoint, although Buckwheat (Fagopyrum) and Rhubarb are cultivated for food, and a few species are grown as ornamentals. In addition, a number of species have become undesirable weeds of wide distribution. Among the ornamentals are the Silverlace Vine (Polygonum aubertii) and the Sea Grape (Coccoloba uvifera), a plant familiar to those who have visited Florida or the Caribbean region.

Key to Genera of the Catskill Polygonaceae

1. Sepals 6, the 3 inner ones much enlarged in fruit (except in Rumex acetosella); flowers greenish-yellow, frequently tinged with red; stigmas tufted, wind-pollinated........................ Rumex
1. Sepals 4-5, nearly equal; flowers pink, purple, white, or greenish-white; stigmas not tufted, not wind-pollinated, 2
    2. Style 2-cleft to base, persistent as 2 rigid deflexed and hooked beaks on the achene; flowers remote on very elongate slender axes, 1-3 in each fascicle, soon deflexed, the greenish calyx not enlarged in fruit................ Polygonum virginianum
    2. Styles 2 or 3, deciduous, not hooked; flowers solitary or in fascicles in axile of leaves or bracts, in spiciform panicles, or in panicled or corymbed racemes; calyx green to whitish or roseate, 3
        3. Leaves triangular-hastate; plant erect; flowers white, in terminal corymbiform clusters........................ Fagopyrum
        3. Leaves not triangular-hastate, or, if so, the stem armed with prickles; flowers of various colors, in axillary clusters or terminal spikelike racemes.......... Polygonum

Fagopyrum Mill. Buckwheat.

Buckwheat is the fruit (so-called seeds) of F. sagittatum and of the species F. tataricum, both herbaceous plants native to central Asia but cultivated also in Europe and North America. Tartary Buckwheat fruits have sharp angles as contrasted with the rounded angles of F. sagittatum. It is one of the standard food crops of some Asiatic peoples, having been cultivated from time immemorial in Nepal and on the confines of China, where the seeds are ground into flour and used in other ways. Buckwheat seems to have been unknown to the Greeks and Romans. It grew wild in Nepal, China, and Siberia and is supposed to have been brought to Europe at the beginning of the 16th century from northern Asia. Fraser found large fields of it at 11,405 feet elevation near the temple of Milun in the Himalayas. It is of recent introduction in northern India and Ceylon, but its cultivation is confined to narrow limits in those areas. The attractive white flowers of both species depend upon bees and other insects for their pollination. The chief food use in the United States and Canada is in the form of griddle cakes made from the flour, often mixed with wheat flour, and in the form of grits sold under the name of kasha. In the United States the production in 1880 was estimated at more than 14,600,000 bushels, fully one-third of which was raised in New York State, but it is not so extensively cultivated at the present time.

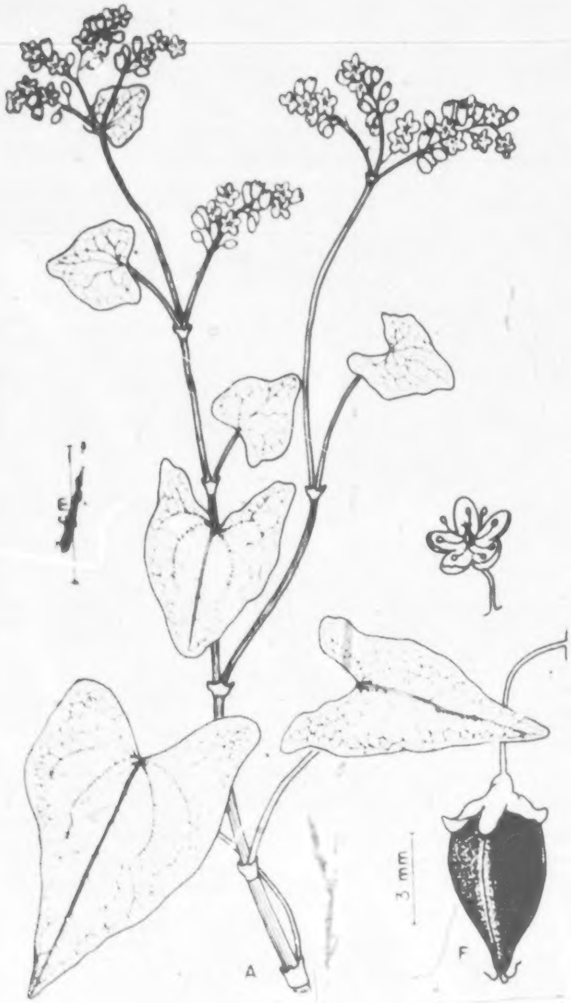
Buckwheat flour is sometimes baked into crumpets, which are popular with Dutch children and are said to be nutritious and easily digested. By the Hindus, buckwheat is eaten on "bart" or fast days, being one of the lawful foods for such occasions. P. cymosum, the Chinese Perennial Buckwheat, and P. tataricum, the Tartary or Rough Buckwheat, also constitute an important source of flour in the Far East, as well as being used as a potherb. In Japan buckwheat flour is prepared in various ways, often being kneaded with hot water to make a dough similar to macaroni. The grains, steamed and dried, are eaten, boiled or made into bread or small cakes. Its young leaves are sometimes eaten as a vegetable and its stalks are used to feed cattle. In the Russian army, buckwheat groats have been served as part of the soldiers' rations and cooked with butter, tallow, or hempseed oil. In Germany it forms an ingredient in pottage, puddings, and other food. Beer can be brewed from the grain, and by distillation it yields an excellent spirit that, in Danzig, is much used in the preparation of cordial waters. The blossoms may be used for dyeing a brown color, and an aurora dye has been obtained from the straw by using a mordant of nitro-muriat of tin. Gold, citron, and lemon yellow can also be obtained.

Buckwheat is sown in May or June and ripens rapidly, thriving on the poorest soil. Mixed with bran, chaff, or grain, its seeds are sometimes given to horses, either whole or broken, and it is considered especially good for fattening pigs. As compared with the principal cereal grains, it is poor in nitrogenous substances and fat; it is therefore greatly inferior to wheat, though as a food it ranks higher than rice. The rapidity and ease with which it can be grown, however, renders it a fit crop for poor land that might produce scarcely anything else.

The husks or chaff are often used for packing material for bulbs and in the garden as a summer mulching material to conserve moisture and to aid in weed control. Buckwheat is likewise an important honey plant, for a field of Buckwheat at the prime of its flowering season is attractive to bees, which gather large stores of honey from it. This honey, though very dark in color, is greatly esteemed for its flavor. On good soils Buckwheat is less productive than other grain crops, but it is particularly adapted to unproductive hilly lands. The USSR, France, Poland, Canada, and the United States lead in Buckwheat production. It is mainly used in England for feeding poultry and pheasants, for which it is considered especially suitable, but it is also valuable for other kinds of farm stock, as it is sometimes sown as forage for sheep and other animals. Its chief importance to the gardener is as a cover crop to smother weeds or as a green manure. For the latter purpose it is sown during the warm season of the year and plowed under when 8 inches high.

Fagopyrum sagittatum Gilib. Buckwheat.

Meaning of Species Name. Arrow-shaped, from the leaves.
Synonyms. F. esculentum Moench. in Gleason (1952).
Other Names. Brank, Corn-heath, Beech-wheat, Crap, Saracen's Corn, Saracen's Wheat, Indian Wheat, Sarrasin, French Wheat, Saracen Corn.
Type of Plant. An annual herb.
Habitat. Commonly esc but not long persistent in waste places, old fields, roadsides, field margins, and the like.
Range. Reported from almost all parts of the n US and s Canada.
Distr in NYS. No distr given in House (1924).
Distr in the Torrey Range. Not a very common esc in most parts of our range.
Elevation. Collected at 1400 ft in Delaware co.
Time of Fl. Jun-Sep; Jun-Sep at Cornell.
Origin. Introd from Asia.



Fagopyrum sagittatum--Buckwheat
[From Mitchell & Dean (1978), p. 59.]

Buckwheat is a small grain crop of minor importance in the United States, where it is planted in northern areas as a ground cover, green manure, or occasionally for forage. Some acreage is harvested for the "grain," a small pyramidal, hard, black-brown achene, as buckwheat flour has some commercial use both in pancake mixes and as groats or kasha in this country. It is a native of central Asia, cultivated in China and other eastern countries as a bread-corn that was first brought to Europe from Asia by the Crusaders, hence in France it is called Saracen Corn.

Wildlife use of Buckwheat is rather limited, as might be expected from the sparse availability of this crop plant; reports on damage to this crop by wildlife are negligible. In some areas Buckwheat has been planted as a food for pheasants and other upland gamebirds.

The medical history of this plant is not extensive. An infusion of the herb was once used in the treatment of erysipelas, and a poultice made of the flour and buttermilk has been applied to restore the flow of milk in nursing mothers. As formerly prepared, breakfast pancakes were often very "heating" and in some people sometimes caused severe itching, felt chiefly after retiring at night, with an eruption of vesicles. The feces also sometimes became so glutinous that expulsion was difficult, but the buckwheat flour used in the United States today is so refined that these symptoms are not likely to occur.

It has long been recognized in Europe as a plant capable of producing photosensitivity in animals and possibly in human beings, for under the proper combination of circumstances, as reported by Kingsbury (1964), ingestion of moderate to large amounts of buckwheat forage, green or dry, or the seeds, by cattle, horses, sheep, goats, swine, and fowl, followed by exposure to intense sunlight, will result in photosensitization. In mild cases, nervous symptoms are observed, including running about, grunting, squealing, bellowing, and jumping; convulsions and prostration result in severe cases. In this hemisphere outbreaks of buckwheat photosensitization are rare, and most, if not all, cases of buckwheat poisoning in human beings are not photosensitizations but obvious allergic reactions to the plant.

Polygonum L. Knotgrass, Smartweed.

This is a nearly cosmopolitan and highly variable genus of some 150-200 species of annual or perennial herbs (usually) or shrubs, several species being noted weeds. The name of the genus is derived from the Greek polu, many, and gonu, knee or joint, referring to the conspicuously thickened joints of the stems of many species. Some botanists have raised the various sections of Polygonum to generic rank, including Aviculare, Persicaria, Bistorta, Tovara, and Tiniaria; of these, Tovara has perhaps the best claim to generic recognition. In North America some 75 species are found, among which are several that have been introduced from the old world.

The flowers, consisting mostly of a 5-lobed calyx and about 8 stamens, are white, greenish, or brightly colored; the latter are therefore easily mistaken for a petaloid corolla and are consequently much visited by insects. In some species, however, as in P. arenastrum (Knotgrass), cleistogamous flowers are produced, while in P. viviparum, many of the lower flowers are replaced by bulbils. The flowers often appear consecutively so that open flowers and mature achenes may be present on the same plant. Mature achenes are necessary for satisfactory identification of the various species.

Except for the weedy species, this genus is of little economic importance, although a number of species are cultivated for ornament, and some were once used in medicine. Among the species of horticultural value is P. affine, a decorative plant from the Himalayas that produces dense short spikes of pink flowers in summer. P. amplexicaule is a dwarf plant, also from the Himalayas, producing slender spikes of red flowers in summer. Both are suitable for the rock garden or for planting in front of the herbaceous border. P. baldschuanicum is a vigorous climber suitable for covering walls or trellises. It grows very rapidly and in summer heads of delicate pink flowers appear which are succeeded by decorative fruits. P. aubertii, the Silver-lace Vine, is similar but has white flowers. Both species should be pruned in winter or early spring in order to keep them under control.

Certain of the more vigorous perennials are liable to become a nuisance in gardens if not kept definitely under control, for they root deeply and every piece of root is capable of producing a new plant. The wild species are common on cultivated land, particularly in moist places, and on cultivated fields that have been neglected for a season. Some of them grow very rapidly and produce large crops of seed. As flowering and seed ripening may go on for several weeks, the young plants should never be allowed to mature, for once an area becomes littered with seeds it is difficult to eradicate these weeds.

In his monograph on the genus *Polygonum*, Small (1895) discusses the economic values of these plants under three categories. First, some of its members are useful medicinal plants. *P. bistorta* is a powerful astringent, while in Europe the roots of *P. amphibium* are often substituted for the true Sarsaparilla and are in many cases preferred to it. *P. hydropiper*, whose foliage is very acrid in the fresh state, is a powerful diuretic and acts as a strong vesicant. "Astringent and diuretic properties exist in *P. virginianum*," he continues, "but the most interesting plant seems to be the common *P. aviculare* [*P. arenastrum*], whose fibrous roots are said to be used as a substitute for quinine in northern and middle Africa, and whose seeds are ... emetic and cathartic." Second, in many countries members of this genus serve as food plants. The fruit of *P. scandens*, *P. convolvulus*, and *P. cilinode* is substituted for Buckwheat, although they contain much less nutritive matter. "In China ... the roots of *P. multiflorum* are used [as food] in the raw state ..." Third, other members of this genus are important dye plants as well as being sources of tannin. *P. hydropiper* imparts a yellow color to wool and has been thus used in different parts of Europe for many years, while in China and Japan a purple dye is made from *P. tinctorium*. "The whole plant of *P. amphibium* is said to be used for tanning in the Western States," of which a given quantity "will make one-third more leather than a like quantity of oak bark, this species containing eighteen per cent. of tannin opposed to twelve per cent. of the amount present in the best oak bark."

The leaves and young shoots of *P. bistorta*, a plant of the northern regions of Europe, have formerly been widely used as a spring vegetable, in the north of England being still used as an ingredient in herb pudding. Although very astringent and bitter to the taste in the raw state, the root contains an abundance of starch and, after being steeped in water and subsequently roasted, it becomes edible. A considerable quantity of the root thus prepared was consumed in Russia, Siberia, and Iceland in times of scarcity as a substitute for flour in making bread. The root is also an article of food among the western Eskimos and, after being roasted in ashes, is not unlike a potato, though not so soft and nutritious. This species is also a useful horticultural plant, for in summer it bears dense slender spikes of showy red flowers and is suitable for planting in moist places. Other species are also sometimes cultivated as vegetables in parts of Asia for eating with boiled meat or fish, or they are collected from the wild to serve as food.

The roots and leaves of *P. bistorta* have also had considerable reputation as a remedy for wounds, so that the plant was generally cultivated for medicinal use as well as for employment as a vegetable, for Bistort root is one of the strongest astringent medicines in the vegetable kingdom. Being highly styptic, it was considered almost specific in the treatment of all bleedings, whether external or internal. It was likewise prescribed for diarrhea, dysentery, cholera, all bowel complaints, and in hemorrhages from the lungs and stomach. A teaspoonful of the powdered root, in a cupful of boiling water, was drunk freely as required. A decoction made from 1 ounce of the bruised root in a pint of boiling water was also considered useful as an injection in profuse menstruation. It has likewise been used as a lotion for ulcers attended with a discharge.

The sap of some species is acrid or peppery, hence the common name "smartweed." In earlier literature on poisonous plants it was judged capable of producing skin irritation and gastrointestinal disturbances in farm animals, but recent cases are not on record. Some suspect these plants of being photosensitizers by reason of circumstantial cases in cattle, an observation that gains weight from the photosensitizing capacity of Buckwheat.

The knotweeds, black bindweeds, false buckwheats, and tearthumbs, particularly those with large seeds, are of special value to upland gamebirds. Seeds of the knotweeds are likewise important food items of ground-feeding songbirds, including bobolinks, red-winged blackbirds, cowbirds, juncos, and several sparrows. White-footed mice also eat the seeds. Of the smartweeds growing in the Catskills, three species are important sources of food for wildlife--Polygonum pensylvanicum, P. persicaria, and P. punctatum. Both waterfowl and many of our most common and best-loved songbirds consume quantities of their seeds, including black ducks, mallards, wood ducks, red-winged blackbirds, bobolinks, cardinals, rose-breasted grosbeaks, juncos, redpolls, and several species of sparrows.

In order to get an overview of the 16 species of Polygonum that grow in the Catskills, it may be helpful to divide them into groups; they should not then be quite so confusing:

1. Style 2-cleft to base, persistent as 2 rigid deflexed and hooked beaks on the achene; flowers remote on very elongate slender axes, 1-3 in each fascicle, soon deflexed

P. virginianum

1. Styles 2 or 3, deciduous, not hooked; flowers solitary or in fascicles in axils of leaves or bracts, or in spiciform panicles, 2
  2. Leaf blades extending down the petioles to form wings that clasp the stem at their bases

P. nepalense

  2. Leaves not as above, 3
    3. Stems twining, vinelike (leaves broadly ovate, cordate at base)

P. cilinode
P. convolvulus
P. scandens

    3. Stems erect or reclining, but not twining vines, 4

4. Stems armed with hooked prickles; leaves hastate or sagittate

P. arifolium
P. sagittatum

4. Stems not armed with prickles, 5
   5. Flowers solitary or in small clusters in the axils of the leaves

P. arenastrum
P. aviculare
P. tenue

   5. Flowers in terminal racemes or spikelike clusters, 6
      6. Outer sepals keeled or winged at maturity; stems stout, commonly 1-2 m tall (spread from cultivation)

P. cuspidatum

      6. Outer sepals not keeled or winged at maturity; plants rarely 1 m tall

P. cespitosum
P. hydropiper
P. pensylvanicum
P. persicaria
P. punctatum

The first species listed above is Jumpseed while the second is the Asiatic Smartweed. The next three might be called the "false climbing buckwheats." Then come the tearthumbs, followed by the knotweeds, all of which are easily placed in their proper groups. The next species is one of the "giant knotweeds," a plant from eastern Asia that has escaped or spread from cultivation. The remaining five species, the smartweeds, all belong to one group, but they can be separated into sections on the basis of the following characters:

1. Leaf sheaths nearly or quite free from marginal cilia (except rarely the uppermost); stems, branches, and peduncles rough-glandular

P. pensylvanicum

1. Leaf sheaths bristly-ciliate on the margins; stems, branches, and peduncles not rough-glandular, 2
   2. Sepals dotted with dark glands

P. punctatum
P. hydropiper

   2. Sepals not glandular-dotted

P. cespitosum
P. persicaria

There now remains only the problem of identifying the various species that make up each of the groups or sections, for which the following key should be helpful:

Key to Local Species of *Polygonum*
(See Key to Genera for *P. virginianum*)

1. Leaf blades extending down the petioles to form wings that clasp the stem at their bases (Asiatic Smartweed)................. *P. nepalense*
1. Leaf blades not extending down the petioles, not clasping the stem, 2
   2. Stems twining, vinelike (leaves broadly ovate, cordate at base --the false climbing buckwheats), 3
      3. Nodes of the stems conspicuously bristly-ciliate at base with reflexed bristles; angles of calyx obscurely keeled; leaves puburulent beneath (achenes glossy; styles separate, divergent; perennial)............................ *P. cilinode*
      3. Nodes of the stem not bristly-ciliate; leaves glabrous but often scabrous on the veins beneath, 4
         4. Angles of the calyx sharply keeled but not winged in fruit; achenes dull; annual; pedicels 3.5-4.5 mm long (styles united)................................. *P. convolvulus*
         4. Angles of the calyx conspicuously winged in fruit; achenes shining; perennial; pedicels 4-10 mm long... *P. scandens*
   2. Stems erect or reclining, not twining vines, 5
      5. Stems armed with hooked prickles; more or less reclining plants with sagittate or hastate leaves (the tearthumbs), 6
         6. Leaves sagittate, the basal lobes directed back; styles 3; achenes sharply 3-angled...................... *P. sagittatum*
         6. Leaves broadly halberd-shaped (hastate), the basal lobes horizontally spreading; styles 2; achenes lenticular.. *P. arifolium*
      5. Stems not armed with prickles, 7
         7. Flowers solitary or in small clusters in the axils of the leaves (the knotweeds), 8
            8. Stem and branches rather sharply angled, erect; leaves plicate with 2 longitudinal folds; minutely spinulose-serrulate; flowers or fascicles of flowers mostly subtended by short bracts, thus forming slender spiciform terminal inflorescences............................ *P. tenue*
            8. Stems and branches more or less terete, prostrate or ascending; leaves flat, entire or obscurely erose; flowers or fascicles of flowers subtended by and greatly overtopped by leaves, not forming partially naked spikes (margins of calyx lobes white or reddish-white; leaves blue-green, acute, 6-30 mm long; pedicels all or mostly included), 9
               9. Plants markedly heterophyllus; perianth divided to below the middle; achenes with 2-3 concave sides; plant spreading to more or less upright...... *P. aviculare*
               9. Plants with subequal leaves; perianth not divided below the middle; achenes usually with 1 sharply concave and 2 convex sides; plants often forming cespitose mats on packed soil.............. *P. arenastrum*

7. Flowers in terminal racemes or spikelike clusters, 10

10. Outer sepals keeled or winged at maturity; stems stout, erect, freely branched, commonly 1-2 m tall (male and female flowers on separate plants; spread from cult--giant knotweed).. P. cuspidatum

10. Outer sepals not keeled or winged at maturity; stems rarely 1 m tall (the smartweeds), 11

11. Leaf sheaths nearly or quite free from marginal cilia, except rarely the uppermost; peduncles strongly glandular-pubescent with obvious divergent stalked glands (spikes thick, erect, pink; stamens 8).................. P. pensylvanicum

11. Sheaths bristly-ciliate on the margins; stem, branches, and peduncles not rough-glandular, 12

12. Sepals dotted with dark glands (spikes erect or flexuous, sometimes nodding; flowers white, flesh color, or greenish-white; stems green or greenish-purple), 13

13. Ocreae gibbous, concealing cleistogamous flowers; calyx greenish or with purple tips; achenes dull or opaque; internodes 2-4 cm long; inflorescence drooping or nodding at tip................. P. hydropiper

13. Ocreae cylindric; cleistogamous flowers lacking; calyx white; achenes lustrous; internodes 3-8 cm long; inflorescence slightly or not at all drooping (annual with slender stems; racemes much interrupted toward the base)................. P. punctatum

12. Sepals not glandular-dotted, 14

14. Spikes dense, ovoid or short-cylindric, 7-11 mm thick; leaf blades acute at base, often with a dark spot near the middle; flowers dull pale greenish-purple or greenish-white.......... P. persicaria

14. Spikes long and slender, 3-5 mm thick; leaf blades green, mostly rounded or obtuse at base, without dark mottling near the middle; flowers roseate or purplish................................ P. cespitosum

Polygonum arifolium L. var. pubescens (Keller) Fern. Halberd-leaved Tearthumb

Meaning of Species Name. With leaves of Arum, i.e., the European A. maculatum; var. name, pubescent.

Other Names. Sickle-grass, Scratch-grass, Hastate Knotgrass.

Type of Plant. A perennial herb.

Habitat. Marshes, wet woods, swamps, wet meadows, and borders of lakes, ponds, and streams.

Range. NB to Minn, s to Ga and Mo.

Distr in NYS. Frequent across the state outside the Adirondack reg, and increasingly common southw.

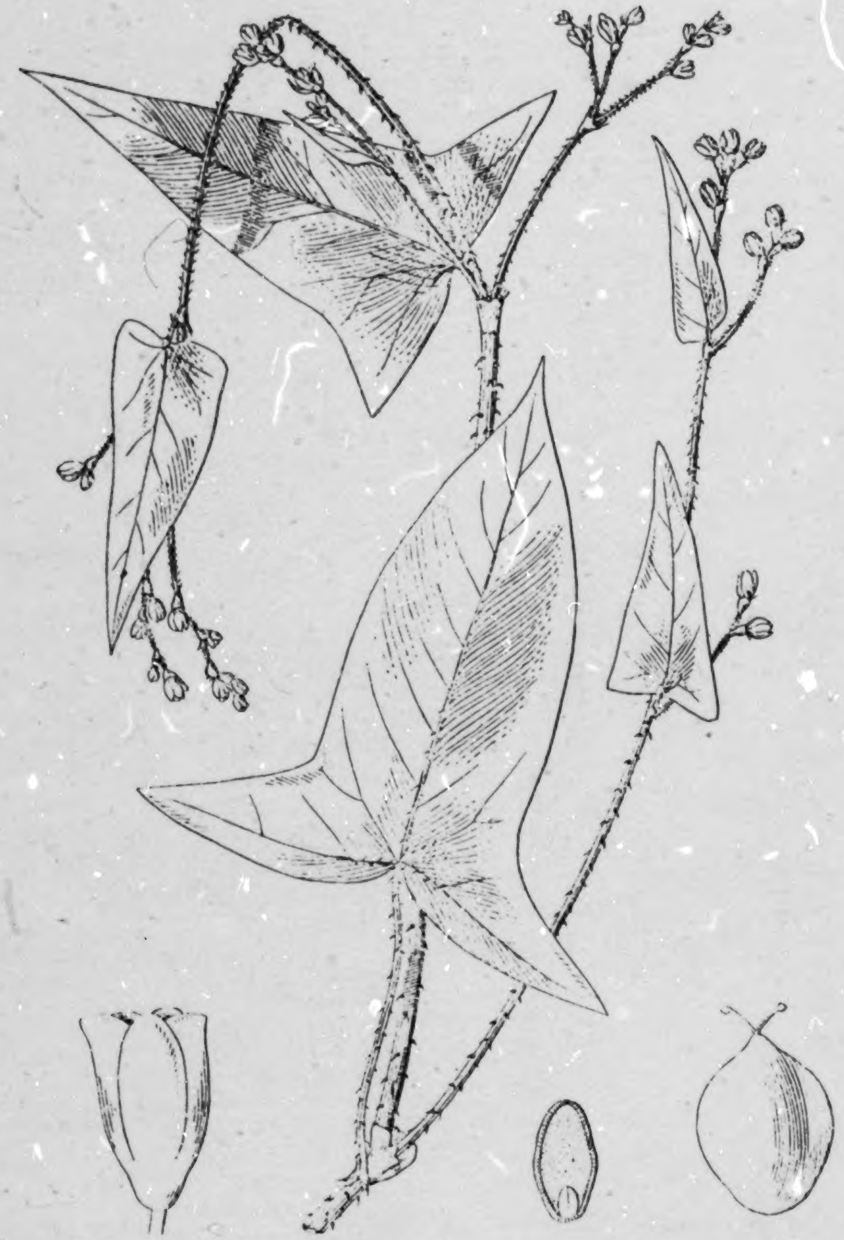
Distr in the Torrey Range. Throughout the range except in the pine barrens.

Elevation. Has been collected at 1320 ft in Delaware co.

Time of Fr. Jul-Oct; Aug-Sep at Cornell.

Origin. Native.

Remarks. An infusion of this plant makes a powerful diuretic, at one time prescribed freely for all urinary afflictions.



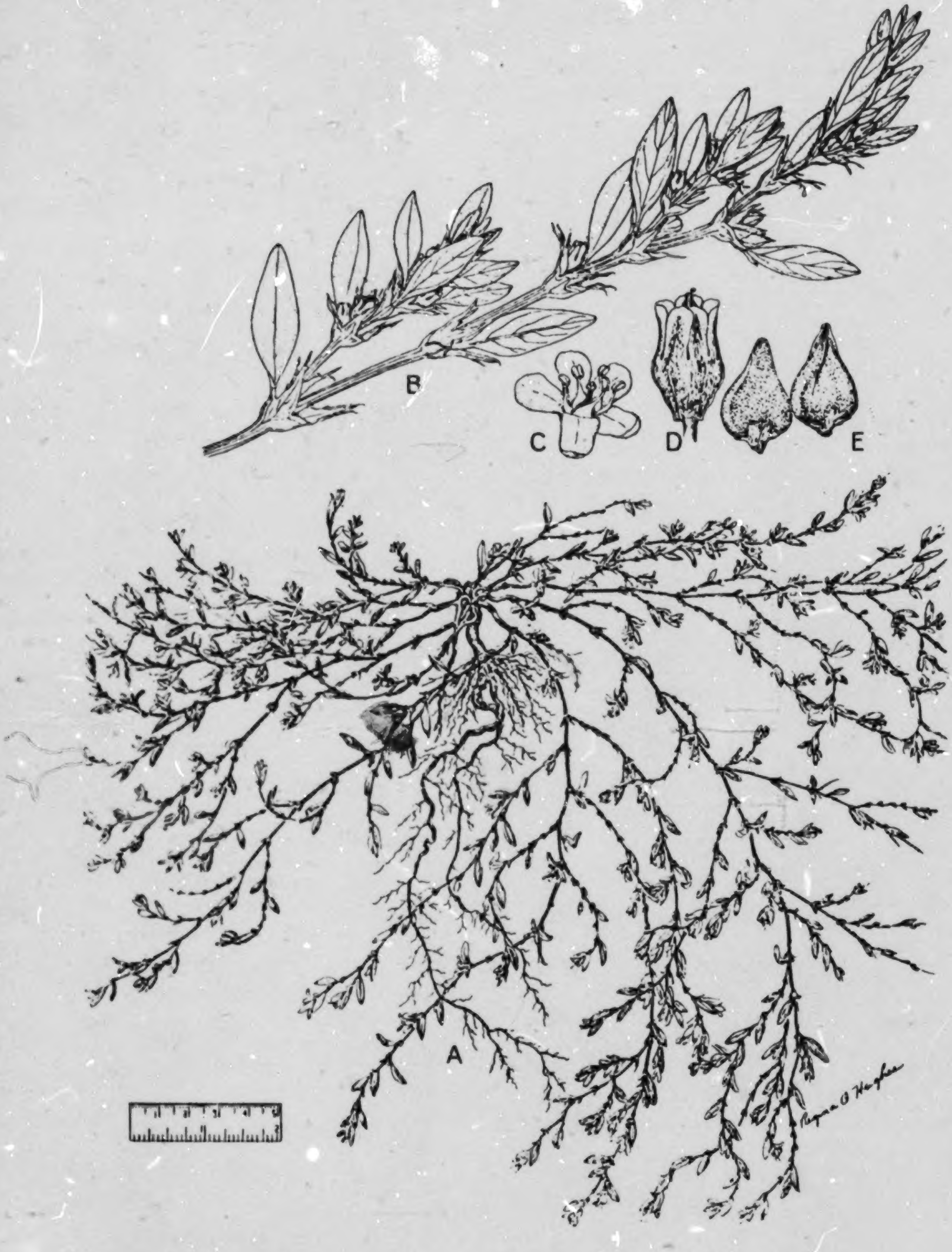
Polygonum arifolium var. pubescens--Halberd-leaved Tearthumb
[From Small (1895), Plate 69, facing p. 164.]

Polygonum arenastrum Bor. Mat-forming Knotweed.

Meaning of Species Name. Pertaining to sand or sandy places.

Other Names. Knotgrass, Doorweed, Pinkweed, Door-grass, Wire-grass, Way-grass, Crab-grass, Cow-grass, Goose-grass, Swine-grass, Bird-grass, Bird's Knotgrass, Bird's-tongue, Sparrow-tongue, Ninety-knot, Matgrass, Stone-grass, Birdweed, Beggar-weed, Wireweed.

Type of Plant. A depressed, mat-forming weedy annual reproducing by seeds.



Polygonum arenastrum--Mat-forming Knotweed
[From USDA Agr. Research Sv (1971), Fig 56, p. 117.]

Habitat. Disturbed soils of waste ground, yards, roadsides, paths, streets, lawns, and gardens, chiefly in hard trampled ground.

Range. Ubiquitous almost throughout the n temperate zone.

Distr in NYS. Common.

Distr in the Torrey Range. Abundant throughout the area.

Elevation. Observed at 2000 ft in Ulster co.

Time of Fr. Jun-Oct; Jul-Oct at Cornell.

Origin. Natzd from Eu.

Grieve (1967) reports that "The seeds are useful for every purpose in which those of the allied Buckwheat are employed and are produced in great numbers, hence one of its local names--Allseed." Gerard remarks that "It is given to swine with good success when they are sicke and will not eat their meate, whereupon the country people so call it Swine's Grass and Swine's Skir." Shakespeare, in *Midsummer Night's Dream*, speaks of this plant as "the hindering Knotgrass," referring to the belief that a decoction of it was efficacious in retarding the growth of children and the young of domestic animals. The same superstition is indicated in Beaumont and Fletcher's *Coxcomb*:

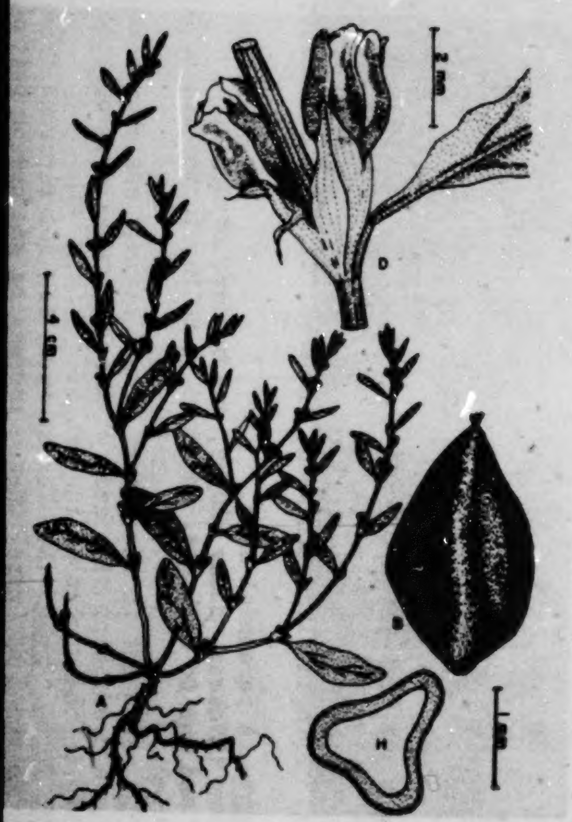
> We want a boy
> Kept under for a year with milk and knotgrass.

Johnson (1867) writes that "The Knot-grass ... produces great numbers of small seeds, which are much eaten by wild birds and poultry.... This little herb is cultivated in Japan, according to Thunberg, as a dye plant, yielding a colour little inferior to indigo."

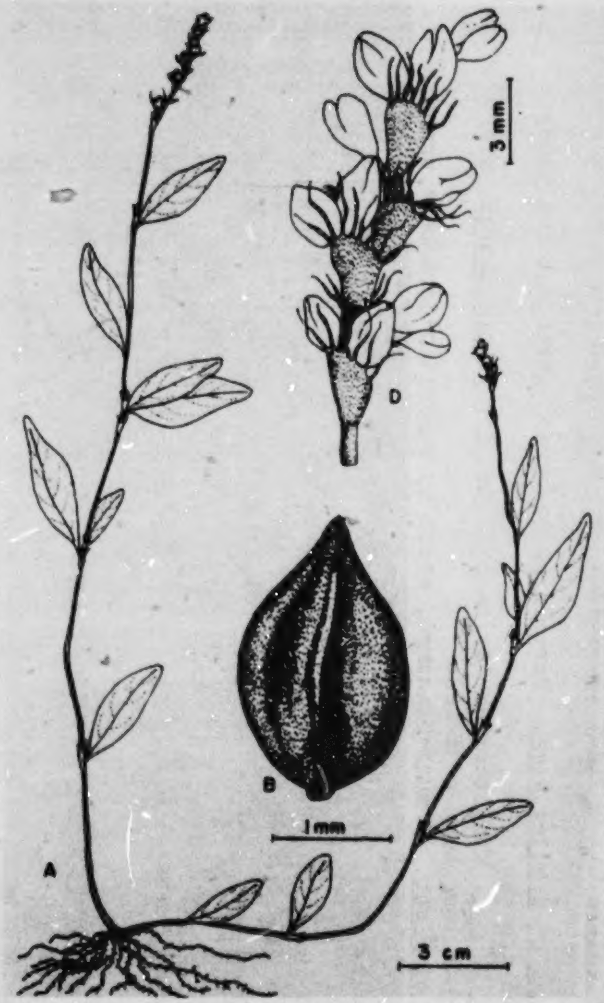
The fruit is emetic and purgative. In addition, the plant has astringent properties, rendering an infusion of it useful in diarrhea, bleeding piles, and hemorrhages; it was also formerly much employed as a vulnerary and styptic. It has diuretic properties also, for which it was employed in strangury and to expel stones, the dose recommended in old herbals being 1 drachm of the herb, powdered in wine, taken twice a day. The decoction was also administered to kill worms. The fresh juice has been found effective in stopping nosebleed, for which purpose it was squirted up the nose and applied to the temples. Made into an ointment, it has proved an excellent remedy for sores. Salmon stated: "Knotgrass is peculiar against spilling of blood, strangury and other kidney affections, cools inflammations, heals wounds, and cleanses and heals old filthy ulcers."

This common weedy annual also supplied the Indians with *pinole* or parched grain, for Steyermark (1963) observes that "The hard fruits of ... [this species] have been used by various Indian tribes as an ingredient for their pinole meal or flour." Not only the loosely spreading or depressed carpet-like species yield possible grains; those from the more erect species have also been used.

In areas where it has become an undesirable weed, Muenscher (1952) suggests that it can be controlled by hand hoeing, hand pulling, and by spraying driveways and paths with a weed-killer.



Polygonum aviculare--Upright Knotweed
[From Mitchell & Dean (1978), p. 36.]


3 mm
D
B
1mm
A
3 cm

Polygonum cespitosum--Long-bristled Smartweed
[From Mitchell & Dean (1978), p. 51.]

Polygonum aviculare L. Upright Knotweed.

Meaning of Species Name. Pertaining to birds, which eat the young leaves and achenes.

Other Names. Much the same as those given for *P. arenastrum*, with which it has long been confused.

Type of Plant. A much-branched, erect to sprawling-decumbent annual, reproducing by seeds.

Habitat. Roadsides, disturbed and cultivated soils.

Range. A cosmopolitan weed.

Distr in NYS. Throughout most of the state except for the Adirondack reg.

Distr in the Torrey Range. Not differentiated from *P. arenastrum* in Taylor (1915).

Time of Fl. Jun-Nov.

Origin. Eurasia.

Polygonum cespitosum Blume var. *longisetum* (DeBruyn) Stewart. Long-bristled Smartweed.

Meaning of Species Name. Tufted; var. name, with long bristles.

Synonyms. *P. caespitosum* Blume in Gleason (1952).

Type of Plant. An annual herb.

Habitat. Roadsides, waste places, shores, and other damp places.

Range. Mass to Ill, s to Del, Md, and Ky.

Distr in NYS. Not listed in House (1924).

Distr in the Torrey Range. Not listed in Taylor (1915).

Time of Fr. Jun-Oct.

Origin. Natzd from se Asia.

Remarks. Locally abundant (but rare in the Catskills); in many places the most abundant species of the genus.

Polygonum cilinode Michx. Fringed Bindweed.

Meaning of Species Name. With ciliate nodes.

Other Names. Fringed Black Bindweed, Bindweed, Climbing Buckwheat, Nimblewill.

Type of Plant. A perennial herb.

Habitat. Dry thickets, rocky slopes, and borders of woods.

Range. Nf and Que to Ont, Wis, and Minn, s to Pa, in the mts to NC and Tenn, and Mich.

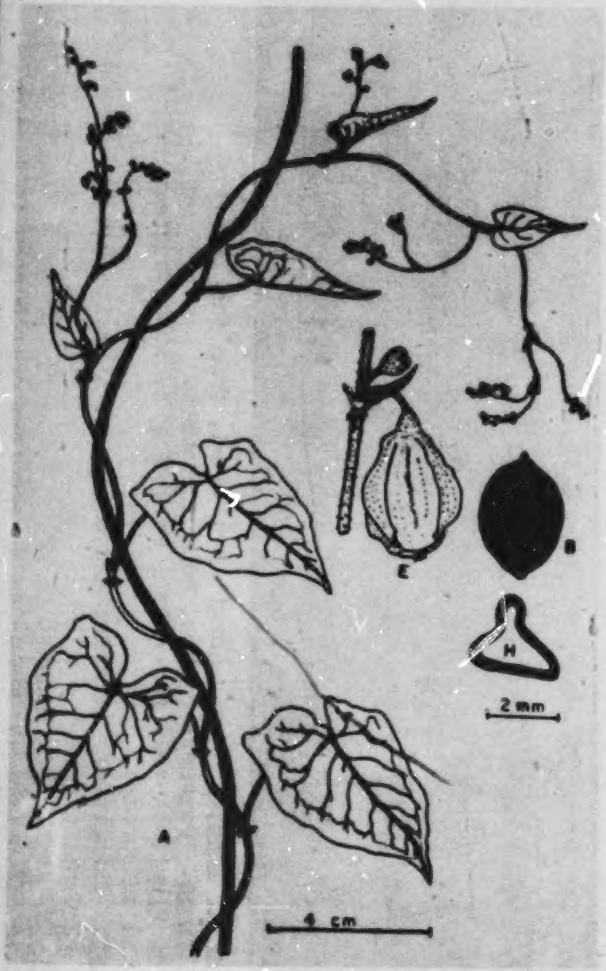
Distr in NYS. Frequent in the n part of the state; less common southw to the Catskills and adjacent highlands of the Hudson valley; reported from LI, and rare in the w part of the state.

Distr in the Torrey Range. NY: Forest Park, LI; not reported from SI; Westchester co and n NYC rare, thence increasing and common northw.

Elevation. Grows to 3000 ft in the Catskills.

Time of Fr. Jul-Aug.

Origin. Native.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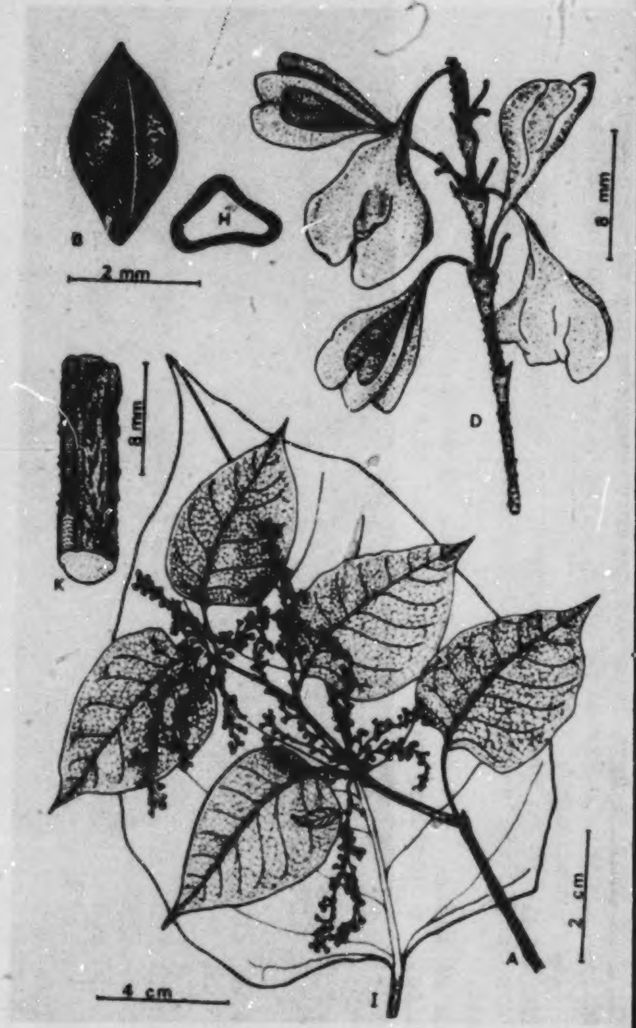
E
B
H
2 mm
4 cm

Polygonum cilinode--Fringed Bindweed
[From Mitchell & Dean (1978), p. 29.]


B
H
2 mm
D
8 mm
8 mm
K
A
I
4 cm
2 cm

Polygonum cuspidatum--Japanese Knotweed
[From Mitchell & Dean (1978), p. 25.]

Polygonum convolvulus L. Black Bindweed.

Meaning of Species Name. An old generic name for any twiner, early botanists, according to Fernald (1950), being more impressed by habit than by floral morphology.

Other Names. Corn Bindweed, Bearbind, Ivy-bindweed, Climbing Bindweed, Cornbind, Devil's-tether, Knot-bindweed, Blackbird Bindweed, Wild Buckwheat.

Type of Plant. An annual, reproducing by seeds.

Habitat. Roadsides, railway tracks, and cult fields, gardens, grainfields, waste places, and thickets.

Range. Throughout the ne states, adjacent Canada, and beyond.

Distr in NYS. Common in most secs of the state as a naturalized weed.

Distr in the Torrey Range. Locally abundant as a weed.

Elevation. Collected at 2900 ft in Greene co.

Time of Fr. Jul-Sep; Jul-Oct at Cornell.

Origin. Natzd from Eu.

Primitive races of the old world sometimes prepared a flour from the seeds of this species, although Johnson (1867) states that "The Climbing Buckwheat ... produces seeds too small to be valuable as human food, but possessing equally nutritive qualities with those of the true Buckwheat, and much relished by poultry and most wild birds."

A citron or lemon yellow dye has been extracted from the whole plant and a musk color from the stalks alone.

This is a troublesome climbing cornfield weed that occurs in all types of soil. It is distributed largely by the seeds being sown with those of the crop among which it has grown. In places where it has become an undesirable weed, Muenscher (1952) suggests that it can be controlled by cultivation, hand weeding, and by harrowing. Spraying as for Charlock (with solutions of copper-, iron-, ammonium sulphate, or other weed-killer) will also largely destroy this weed in cereals.

It may be harmful to animals, owing to mechanical injury from the seeds when fed with grain; horses are said to have been killed in this manner.

Polygonum cuspidatum Sieb. & Zucc. Japanese Knotweed.

Meaning of Species Name. Abruptly pointed, from the leaves.

Other Names. Japanese Bamboo, Mexican Bamboo.

Type of Plant. A tall perennial, spreading by stout subterranean rhizomes and offshoots.

Habitat. Planted for ornament and often esc in waste places and neglected gardens.

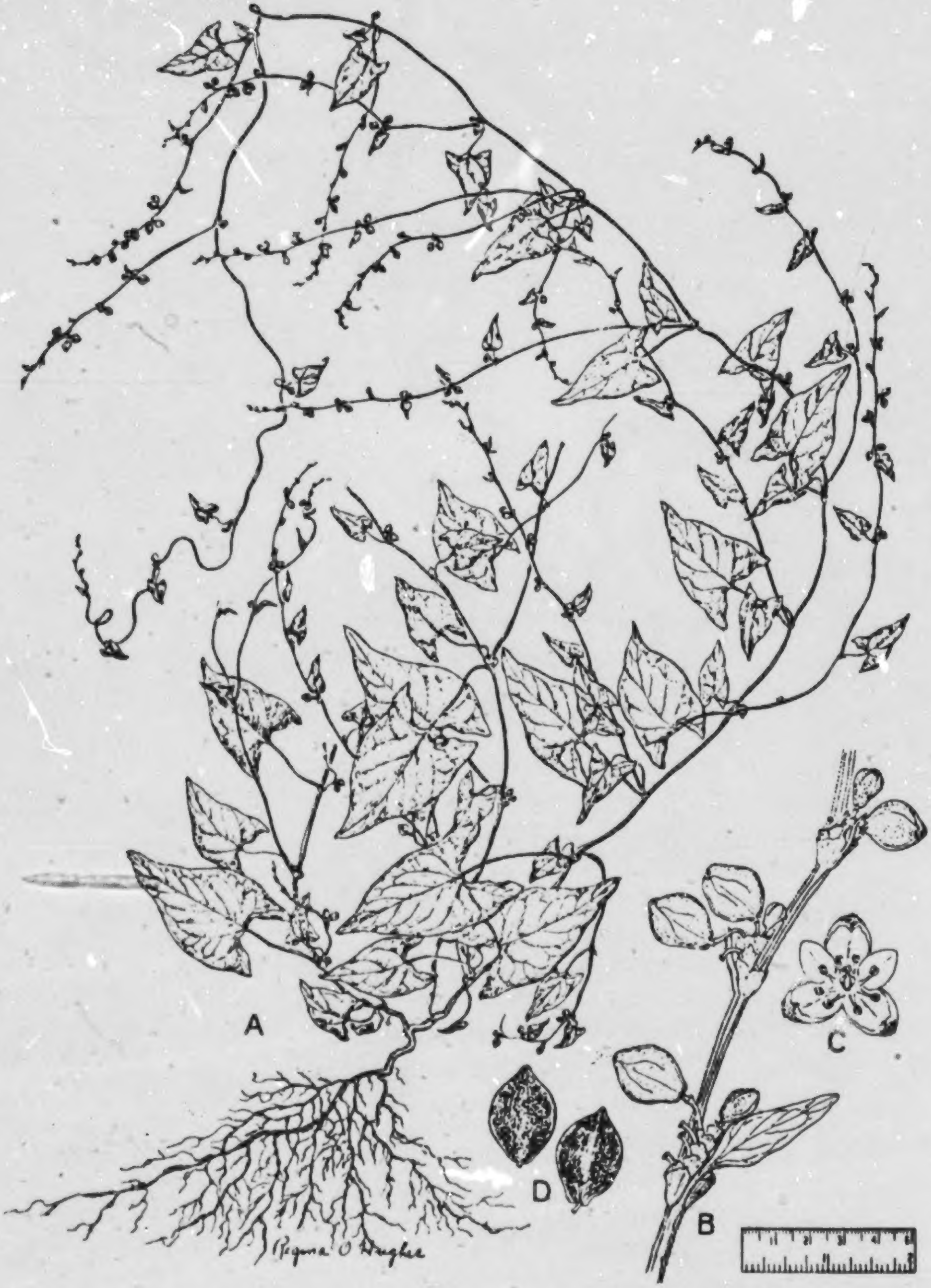
Range. Nf to Ont and Minn, s to Md.

Distr in NYS. Locally common as an esc from cult northw to Albany co and westw to L Erie.

Distr in the Torrey Range. Often common as a rather local esc.

Elevation. Has been collected at 1920 ft in Delaware co.

Time of Fl. Aug-Sep.


A
B
C
D
Regina O. Hughes

Polygonum convolvulus--Black Bindweed
[From USDA Agr. Research Sv. (1971), Fig 58, p. 121.]

Origin. A native of Japan; introd from e Asia.
Remarks. Rapidly spreading and becoming obnoxious.

Japanese Knotweed, as its common name might imply, is a native of eastern Asia. It came to the United States by way of Europe, where it was introduced from Japan at least by 1864. It is a handsome ornamental plant with attractive flowers, but it spreads so rapidly that it is safe to plant only in the rare place where it can be rigidly confined, as it has few rivals for vigor of growth and rapid multiplication by its roots and can soon become a pernicious weed. The flowers are sometimes gathered and dried for use in winter bouquets.

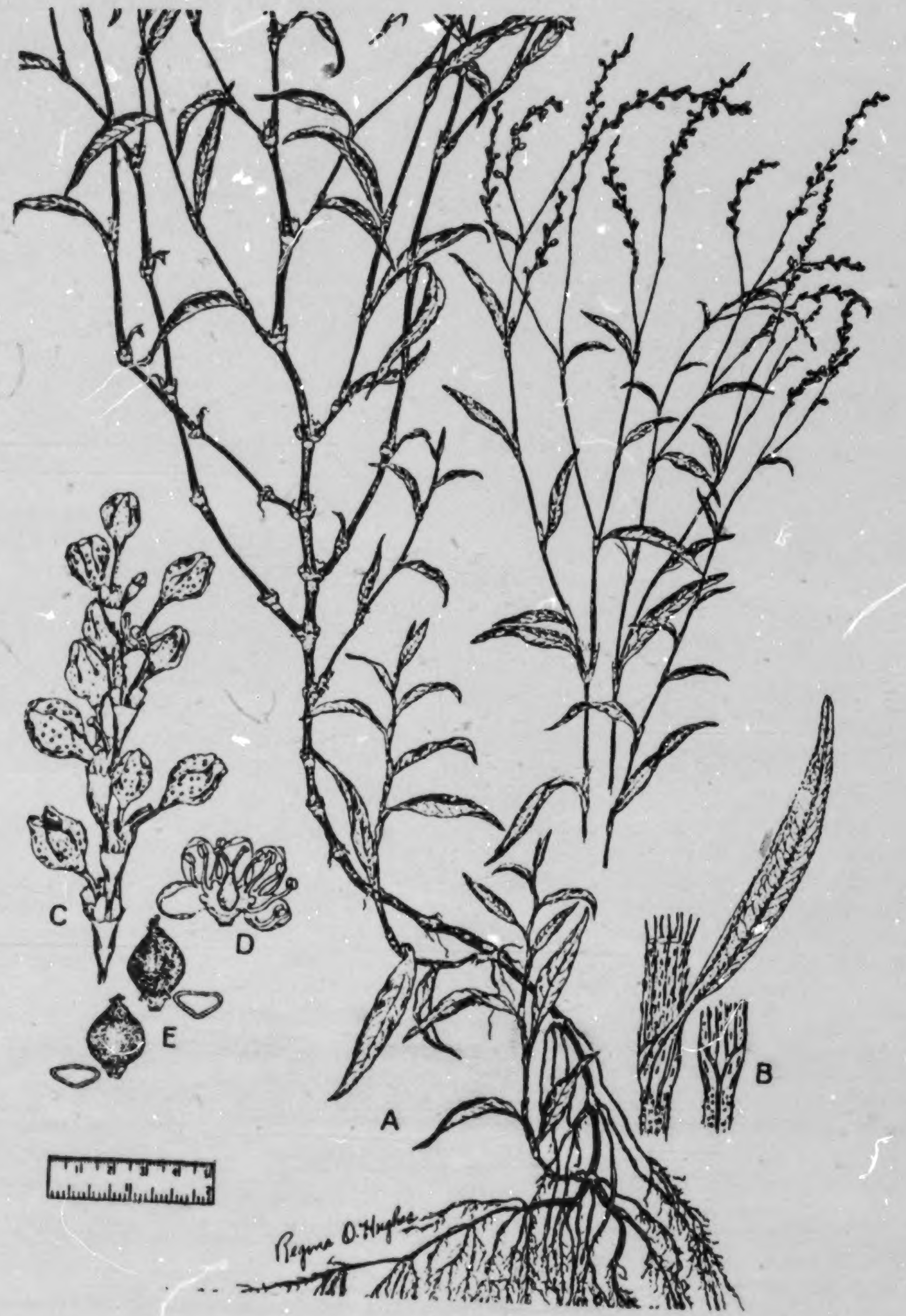
When this plant first reached Europe, a Belgian botanist did some experimenting with the young stems 8 to 10 inches high to see whether or not they were of culinary value, boiling or steaming them for 3 or 4 minutes, after which they were salted and buttered. His report was enthusiastic, for he stated that "we are able to affirm *de gusta*: that a plate of young stems of *Polygonum cuspidatum* is a DELICIOUS ARTICLE, as good at least as asparagus, preferable to chicory, and, above all, than sorrel." After cooking, these young stems can also be chilled and served with mayonnaise, hollandaise sauce, or sour cream. They cook very quickly, so care must be exercised to see that they are not overdone. Some people are not enthusiastic about their acid taste, but a little sugar can be added if they seem too tart. Peeled, these stalks can also be cut up and used raw to give an added flavor to what might otherwise be a rather dull green salad.

These cooked stalks can likewise be pureed by putting them through a colander or a food mill. This puree, seasoned with salt and sugar, can be used in the preparation of a cold soup, quite reminiscent of the fruit soups so popular in the Scandinavian countries. A tasty aspic salad can also be made from 2 cups of the puree by adding 2 tablespoons of sugar and 1/2 teaspoon of salt, then mixing with 1 envelope of unflavored gelatin prepared in the usual manner.

The cooked stalks can likewise be used like Rhubarb in the preparation of pies, sweet sauces, and jams. In his *Stalking the Wild Asparagus*, Euell Gibbons gives directions for making an unusual sweet-tart sauce. He put 3 cups of peeled and chopped stalks in a saucepan, added 1 cup of sugar, the juice of 1 lemon, and about 1 teaspoon of finely grated lemon peel. By letting it stand a few minutes, the sugar will draw enough juice so no water need be added. This mixture is boiled for only a few minutes until it is soft; it is then ready to serve, hot or cold.

Polygonum hydropiper L. Water Smartweed.

Meaning of Species Name. An old name meaning water-pepper.
Other Names. Biting Persicaria, Biting Knotweed, Bite-tongue, Snakeweed, Sickle-weed, Pepper-plant, Red-shanks, Red-knee, Water-pepper, Marsh Pepper, Common Smartweed.
Type of Plant. An annual herb, reproducing by seeds.
Habitat. Damp soils of waste places, low meadows, pastures, and cult ground.
Range. Que to BC, s to Ala, Tex, and Cal; also in Eurasia.


C
D
E
A
B
Regina O. Hughes

Polygonum hydropiper--Water Smartweed
[From USDA Agr. Research Sv. (1971), Fig 59, p. 123.]

Distr in NYS. Common in most secs of the state except the densely forested and higher portions of the Adirondacks and Catskills.

Distr in the Torrey Range. Throughout the range, often becoming a weed.

Elevation. Has been collected at 1900 ft in Delaware co.

Time of Fr. Jul-Sep; Aug-Sep at Cornell.

Origin. Native.

Linnaeus remarked that all domestic quadrupeds reject this plant, and some care should be taken in handling it, for the leaves contain a pungent juice which causes smarting when it comes in contact with the eyes, while Johnson (1867) remarks that "The Water-pepper ... is sufficiently acrid to produce blisters when applied to the skin." Steyermark (1963) states that "Some cases in Europe have been reported of poisoning of stock traced to eating the plants" of this species. The plant's irritant properties are due to polygonic acid, which forms in green deliquescent crystals having a bitter, acrid taste and a strong acid reaction. It is destroyed by heating or drying but imparts its properties to alcohol or water. When used medicinally the tincture must therefore be made from the fresh plant as both heat and age destroy its qualities. It is said that this herb, together with Arborvitae, constituted the antivenereal remedy of Count Mattei.

In American medicine it has been used as a stimulant, vesicant, diuretic, diaphoretic, and emmenagogue, and was considered efficacious in treating amenorrhea. In combination with tonics and gum myrrh, it is said to have cured epilepsy. An infusion in cold water, which may be readily prepared from the fluid extract, has been found serviceable in gravel, dysentery, gout, sore mouth, colds, and coughs, and, mixed with bran, in bowel complaints. Antiseptic and desiccant virtues are also claimed for it. A hot decoction made from the whole plant has been used as a remedy for cholera, a sheet being soaked in it and wrapped around the patient immediately the symptoms start. In Mexico, the infusion is used not only as a diuretic, but it is also put into the bath of sufferers from rheumatism.

The extract, in the form of an infusion or fomentation, has been beneficially applied in chronic ulcers and hemorrhoidal tumors, also as a wash in chronic erysipelous inflammations. Simmered in water and vinegar, it has proved useful in gangrenous conditions. The root was chewed for toothache (probably as a counterirritant) and the bruised leaves were used as a poultice to whitlows. In addition, a water distilled from the plant, taken at the rate of a pint or more a day, was considered useful in the treatment of gravel and stone. The expressed juice of the freshly gathered plant was likewise employed in treating jaundice and dropsy, the dose being from 1 to 3 tablespoonfuls. Other American smartweeds, which possess properties similar to those of this one, have also been used in medicine.

By some authorities on dyes of the early 18th century, this plant was considered to produce the most durable yellow obtainable for wool and a more permanent dye than fustic on cotton. An alum mordant produces a yellow, while a chrome mordant results in a gold color. To prepare the dye for 1 pound of wool, 1 peck of the fresh plant (except for the roots) was chopped and soaked for 3 to 4 days, then brought to a boil. The temperature was then reduced and the mixture was steeped for half an hour, after which it was strained to produce a dye bath of 4 to 4 1/2 gallons. The wetted and mordanted wool was then immersed in the dye bath, brought to a boil, and steeped for 1 hour, after which the wool was rinsed and dried.

In areas where this species has become an undesirable weed, Muenscher (1952) states that it can be destroyed by clean cultivation, hand hoeing, harrowing, frequent mowing in pastures and meadows, and by improved drainage.

Polygonum nepalense Meisn. Asiatic Smartweed.

Meaning of Species Name. Of Nepal.
Type of Plant. An annual herb.
Habitat. Shaded roadsides and riverbanks.
Range. Ct and NY.
Distr in NYS. Not listed in House (1924).
Distr in the Torrey Range. Not listed in Taylor (1915).
Elevation. Sea level-1600 ft.
Time of Fl. Jul-Aug.
Origin. Adv from Asia.

This species was first collected in New York State by the writer in the Town of Walton on 28 July 1974, where a fairly large colony was growing in packed soil on a shaded, little-traveled mountain roadside. The only previous report of this plant in North America is from a riverbank in Connecticut. Its occurrence in Delaware County some 150 miles west of the Connecticut station is decidedly something of a mystery. The following year three more stations were located, and in 1978 it was observed growing in Sullivan County, indicating that it is more widespread in the Catskills than was at first apparent, since it is now known to occur along both branches of the Delaware river as well as in the mountains between. At each station rather shaded roadsides seem to be the preferred habitat. In its native land of Nepal and Sikkim on the scuthern slopes of the Himalayas between India and Tibet, this species is used as a dye plant to produce a yellow color. This plant was first described by Karl Friedrich Meisner in 1826; the accompanying illustration is from his monograph of the genus, published in Geneva during that year.

Polygonum pensylvanicum L. var. laevigatum Fern. Pinkweed.

Meaning of Species Name. Of Pennsylvania; var. name, smooth.
Other Names. Pennsylvania Persicaria, Pennsylvania Smartweed, Purplehead, Glandular Persicary, Heart's-ease, Swamp Persicary.
Type of Plant. An annual herb, reproducing by seeds.
Habitat. Damp grasslands, waste places, clearings, disturbed or cult soil, and along ditches, damp shores, and thickets.
Range. Que and Minn, SD, and Col, s to Va, upland NC, Ky, Tenn, Mo, Okla, and Tex.
Distr in NYS. The common form occurs almost everywhere throughout the state except in the higher Adirondacks.
Distr in the Torrey Range. Common as a weed throughout the reg.
Elevation. Grows to 2000 ft in Va.
Time of Fr. Jul-Sep; Aug-Sep at Cornell.

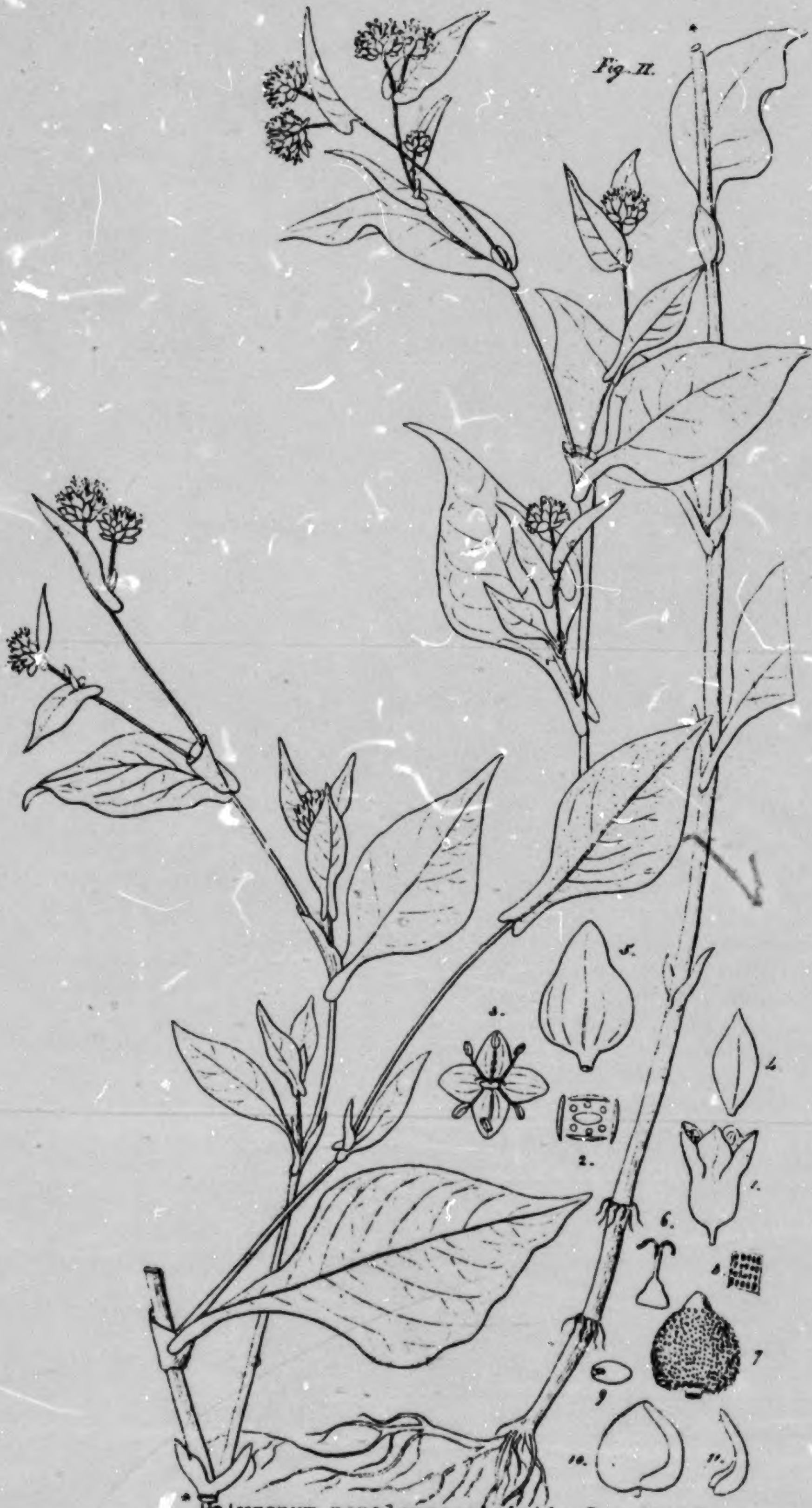


Fig. II.
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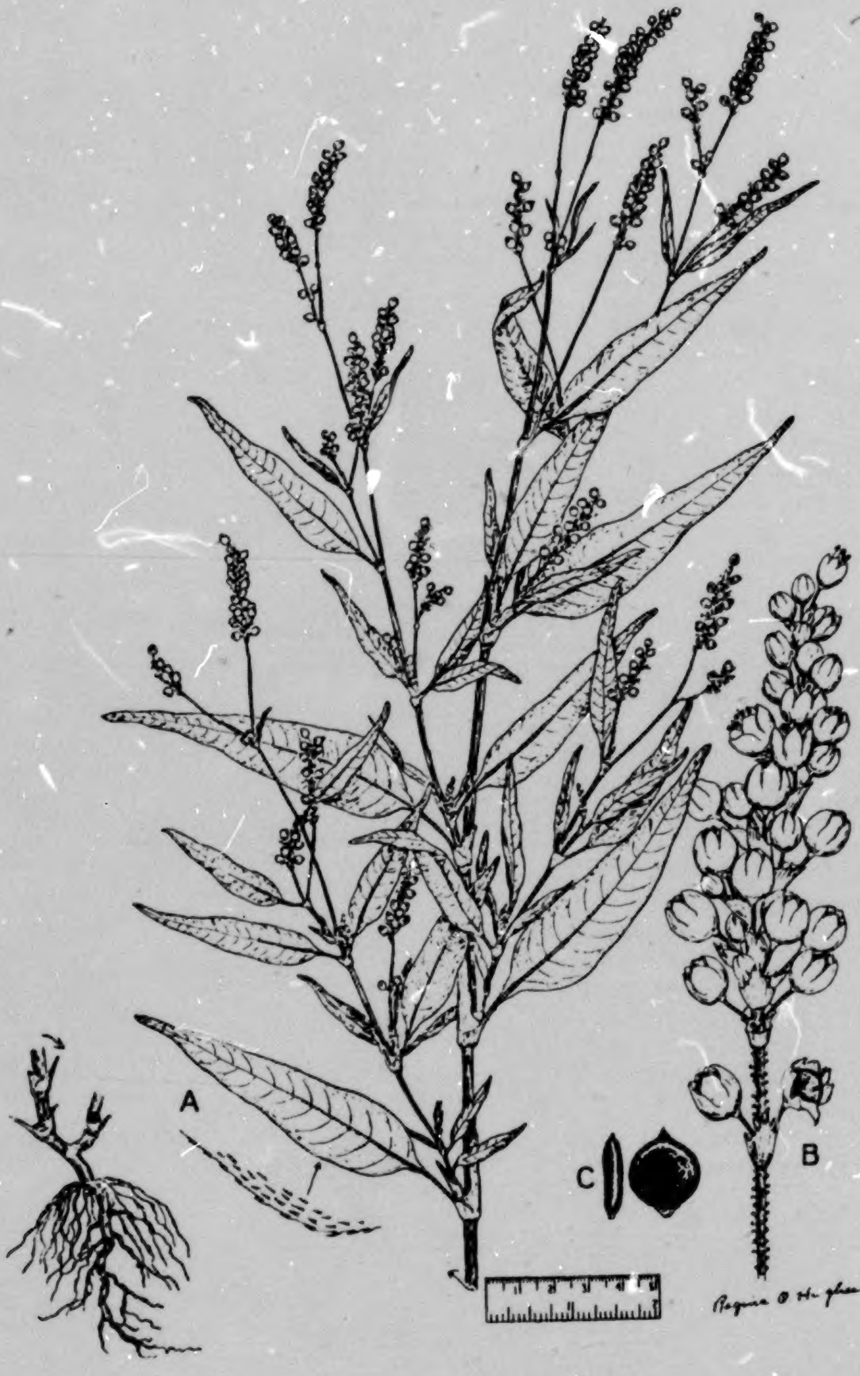
* Polygonum nepalense--Asiatic Smartweed
[From Meisner (1826), Plate 7, Fig 2.]



Polygonum pensylvanicum--Pinkweed
[From USDA Agr. Research Sv. (1971), Fig. 60, p. 125.]

Origin. Native.

Remarks. Var. laevigatum is the common plant of the Catskills; the typical form is restricted to the coastal region.

Steyermark (1963) notes that "The achenes of P. pensylvanicum are a source of food for wildfowl and upland game birds, and the plant itself is browsed by deer and muskrat," in addition to the fact that "The fragrant flowers are much visited by bees." Where this plant has become an undesirable weed, it can be controlled by the same methods as those given for P. hydropiper.

Polygonum persicaria L. Lady's-thumb.

Meaning of Species Name. An old generic name, said to come from the leaves resembling those of Persica, the Peach.

Other Names. Heart's-ease, Heartweed, Common Persicary, Spotted Knotweed, Redweed, Peachwort, Willow-weed, Red-shanks, Lover's-pride, Black-heart, Persicary, Spotted Smartweed, Pinkweed.

Type of Plant. An annual herb, reproducing by seeds.

Habitat. Damp clearings, cult ground, roadsides, shores, and waste places.

Range. Nf to Ak, s to Fla, Tex, and Cal.

Distr in NYS. Common.

Distr in the Torrey Range. Frequent as a weed in most parts of the range.

Elevation. Has been collected at 2900 ft in Greene co.

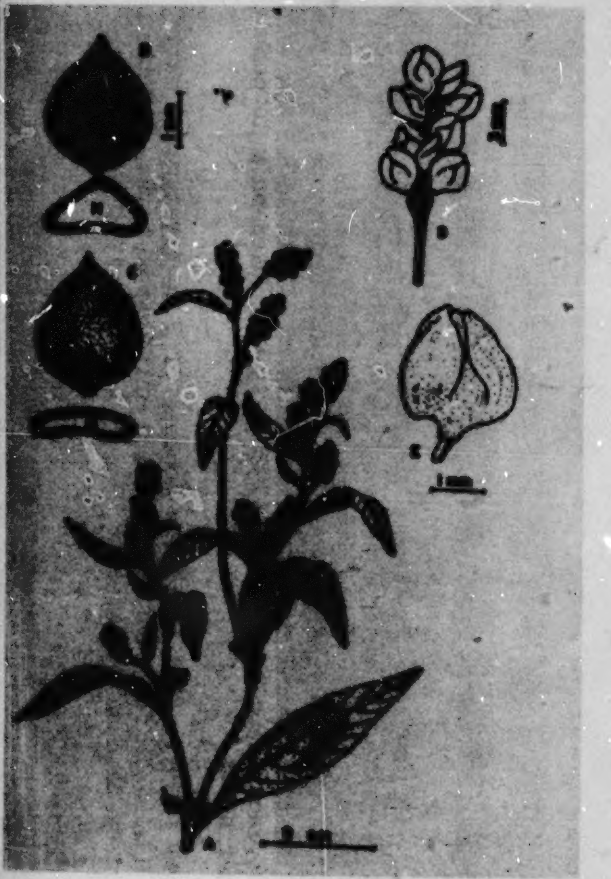
Time of Fr. Jun-Oct; Jul-Sep at Cornell.

Origin. Natzd from Eu.

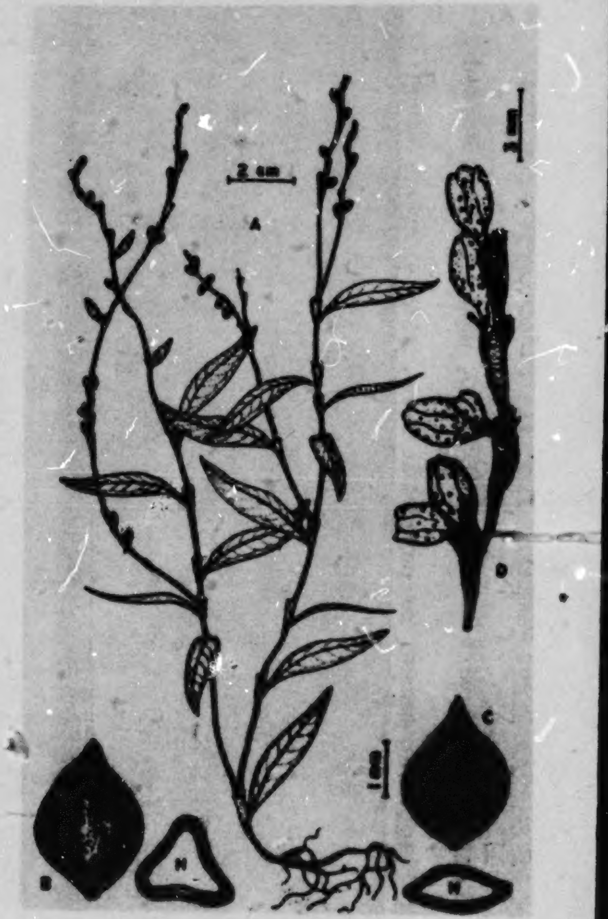
The leaves of this and other common smartweeds are usually very peppery and make a quickly available seasoning in camp cooking. They should be used with caution, however, since they are very pungent and are apt to draw tears as quickly as cayenne pepper. Horace Kephart reported that this plant was used as "an early salad plant in the southern mountains," and Steyermark (1963) remarks that "This is one of the species of Polygonum from which smartweed honey is derived." He also notes that "The achenes are frequently eaten by wildfowl and upland game birds." At least one Indian tribe made medicinal use of this plant, for Densmore (1928) reports that the Chippewas employed a decoction of the flowers and leaves of this species in treating pain in the stomach. It was regarded as "strong medicine, yet 1 sprig not enough for a treatment." This decoction, taken internally, was "Used alone and also in combinations" with other herbs.

During the 18th and early 19th centuries this weed was recommended by professional dyers because of the durable yellow color it imparted to woolens, cottons, and linens. Plants were cut while in bloom, then dried, and soaked for several days to induce fermentation. The dye liquid was then heated and alum-mordanted cloth immersed in it. One 19th century dyer also suggested its use in compound colors such as black, smoke, snuff, and green.

In areas where this species has become an obnoxious weed, Muenscher (1952) suggests that it can be controlled by clean cultivation, hand hoeing, harrowing, and by frequent mowing in pastures and meadows.



Polygonum persicaria--Lady's-thumb
[From Mitchell & Dean (1978), p. 52.]



Polygonum punctatum--Dotted Water Smartweed
[From Mitchell & Dean (1978), p. 57.]

Polygonum punctatum Ell. var. *confertiflorum* (Meisn.) Fassett. Dotted Water Smartweed.

Meaning of Species Name. Dotted, from the glandular sepals; var. name, with crowded flowers.
Other Names. Water smartweed, Turkey-troup, Water-pepper, Dotted Smartweed.
Type of Plant. An annual or perennial herb, with elongate tough branching rootstocks.
Habitat. Wet soil, open swamps, shores, shallow water, and the like.
Range. Que to Fla, w to the Pacific; also in trop Am.
Distr in NYS. Frequent across the state outside the higher Adirondacks.
Distr in the Torrey Range. Common throughout the range in some of its forms.
Elevation. Has been collected at 1400 ft in Delaware co.
Time of Fr. Jul-Sep; Aug-Sep at Cornell.
Origin. Native; a wide-ranging species of NAm, SAm, and s Asia.

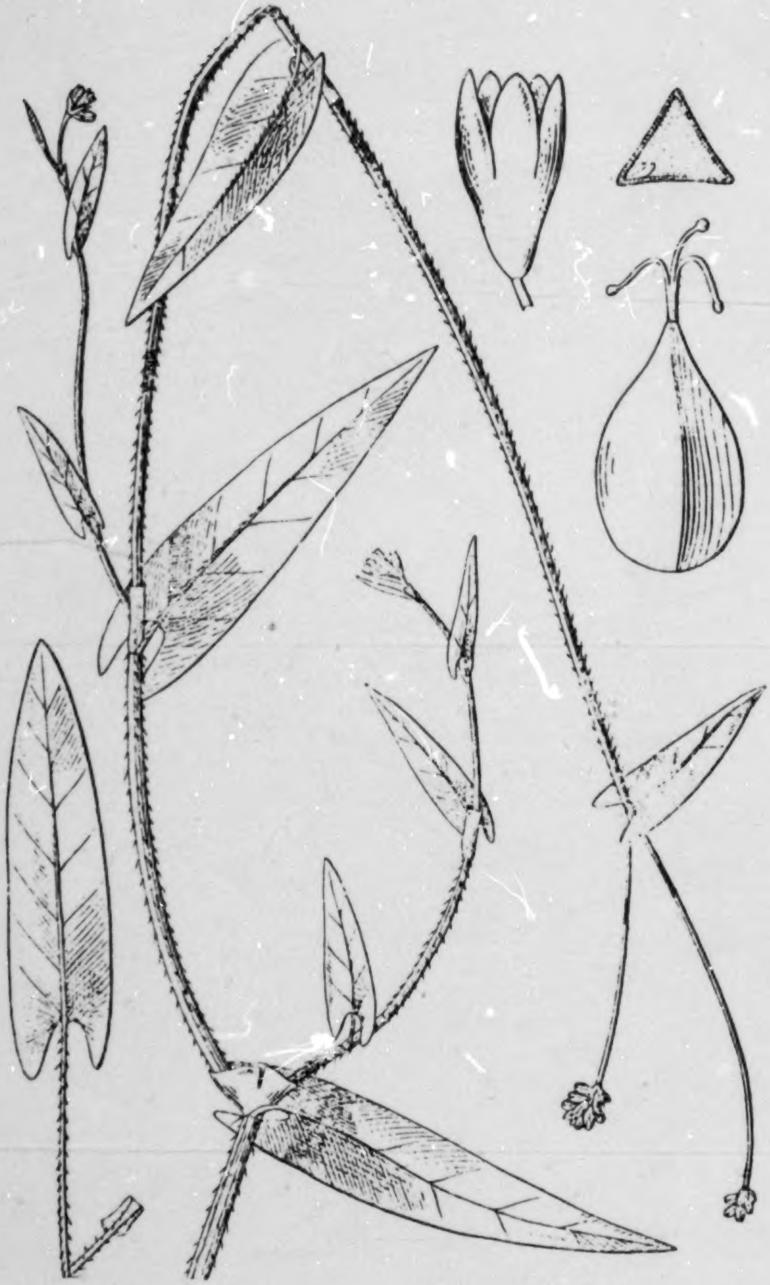
The medicinal use of smartweeds among the laity, who also included *P. hydropiper*, was at one time very general and extended, especially as to fomentation in amenorrhea, dysmenorrhea, enteritis, and mastitis, and internally in the same troubles and in coryza. The fresh leaves, bruised with those of the Mayweed (*Anthemis cotula*) and moistened with a few drops of oil of turpentine, made a speedy vesicant, and, as such, were once highly esteemed. A cold infusion, taken internally, was considered very serviceable in treating sore mouth, gout, and dysentery and was likewise used externally as a wash for indolent ulcers and painful hemorrhoids.

The whole fresh plant was chopped, pounded to a pulp, and weighed. Then 2 parts by weight of alcohol were taken, the pulp thoroughly mixed with 1/6th part of it, and the rest of the alcohol added. After having stirred the whole well, it was poured into a well-stoppered bottle and allowed to stand 8 days in a cool, dark place. It is an irritant to mucous membranes regarded of significant value in the treatment of enteritis, gastritis, cystitis, and other inflammatory diseases of these tissues. Lighthall (n.d.) considered it a powerful stimulant and prescribed it in the form of a hot tea to restore the monthlies when suddenly arrested, using it at the same time in a hot foot bath. The Chippewas also made medicinal use of this species, employing a decoction of the flowers and leaves in treating pain in the stomach, but, according to Densmore (1928), it was "Used only in combinations" with other herbs.

Steyermark (1963) notes that "The achenes of *P. punctatum* and varieties serve as desirable food for wildfowl and upland game birds, and the plant is browsed by deer and muskrat."

Polygonum sagittatum L. Arrow-leaved Tearthumb.

Meaning of Species Name. Arrow-shaped, from the leaves.
Other Names. Arrow-vine.
Type of Plant. An annual herb, reproducing by seeds.
Habitat. Wet meadows, marshes, thickets, and shores.



Polygonum sagittatum--Arrow-leaved Tearthumb
[From Small (1895), Plate 68, facing p. 162.]

Range. Nf and Que to Sask and Neb, s to Ga and Tex; also in Asia.

Distr in NYS. Common throughout the state except in the pine barrens of LI but absent in the Adirondacks above 3000 ft.

Distr in the Torrey Range. Common throughout the range except in the pine barrens.

Elevation. Grows to 3000 ft in Va; observed at 1900 ft in Delaware Co.

Time of Fr. Aug-Sep; Aug-Sep at Cornell.
Origin. Native.
Remarks. This plant has been used with success in nephritic colic, relieving the pains caused by gravel.

Polygonum scandens L. Climbing False Buckwheat.

Meaning of Species Name. Climbing, from its habit of growth.
Other Names. False Buckwheat, Hedge Bindweed, Hedge Buckwheat.
Type of Plant. Perennial or annual, reproducing by seeds.
Range. Que to ND, s to Va and Okla.
Distr in NYS. Common across the state but rare in the higher Adirondacks and absent from the pine barrens of LI.
Distr in the Torrey Range. Locally abundant sometimes as a troublesome weed, but rare or wanting in the pine barrens.
Time of Fr. Aug-Sep; Aug-Sep at Cornell.
Origin. Native.

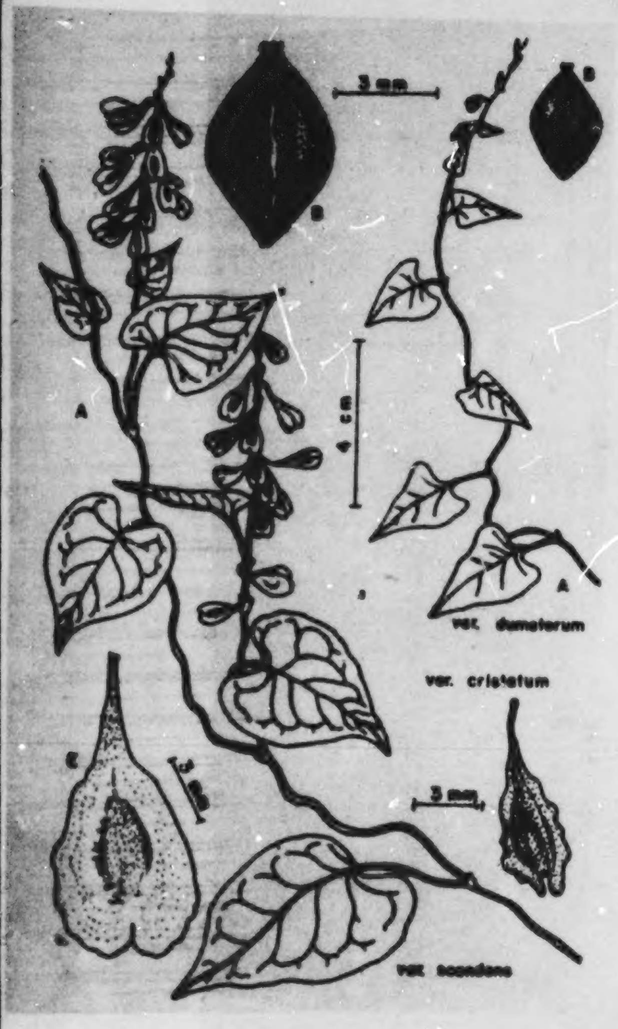
The seeds of this species were sometimes used by the Indians for making a meal, which has the qualities of Buckwheat flour, but the grains are hard-shelled and contain only a small amount of starch. A musk-colored dye has been extracted from the stalks. Climbing False Buckwheat may be harmful to animals, owing to mechanical injury from the seeds. Where it has become an obnoxious weed, Muenscher (1952) suggests that it can be controlled by hand pulling, mowing, or burning.

Polygonum tenue Michx. Slender Knotweed.

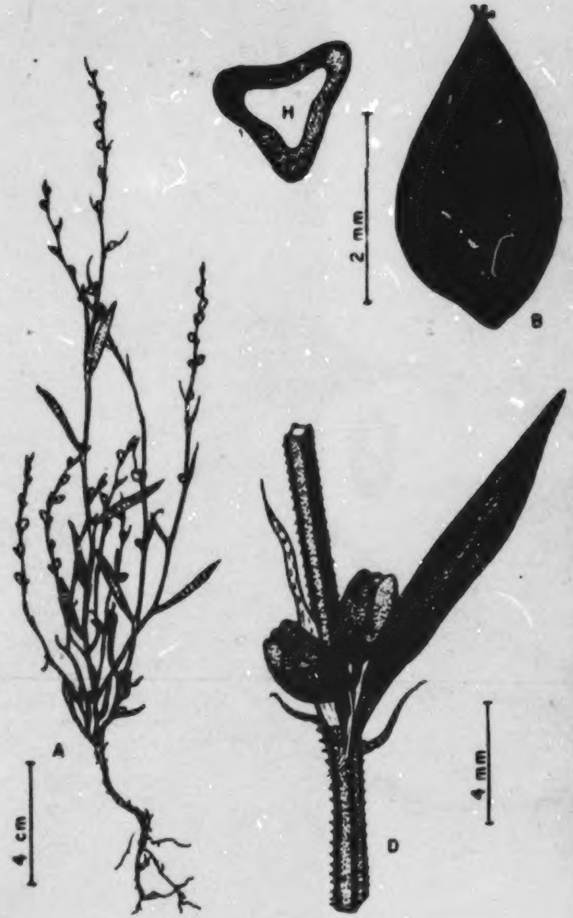
Meaning of Species Name. Slender.
Type of Plant. An annual herb.
Habitat. Dry, open, chiefly acid or sandy, soils.
Range. Me to Minn, s to Ga, Ala, Ark, Okla, and Tex.
Distr in NYS. Locally common across the state from Washington and Rensselaer co westw and southw; not definitely reported from LI; local northw to L Champlain and to the St Lawrence river but apparently absent from the Adirondack reg.
Distr in the Torrey Range. Frequent throughout the area except in the pine barrens of LI and NJ, there rare or wanting.
Time of Fr. Jul-Sep.
Origin. Native.

Polygonum virginianum L. Jumpseed.

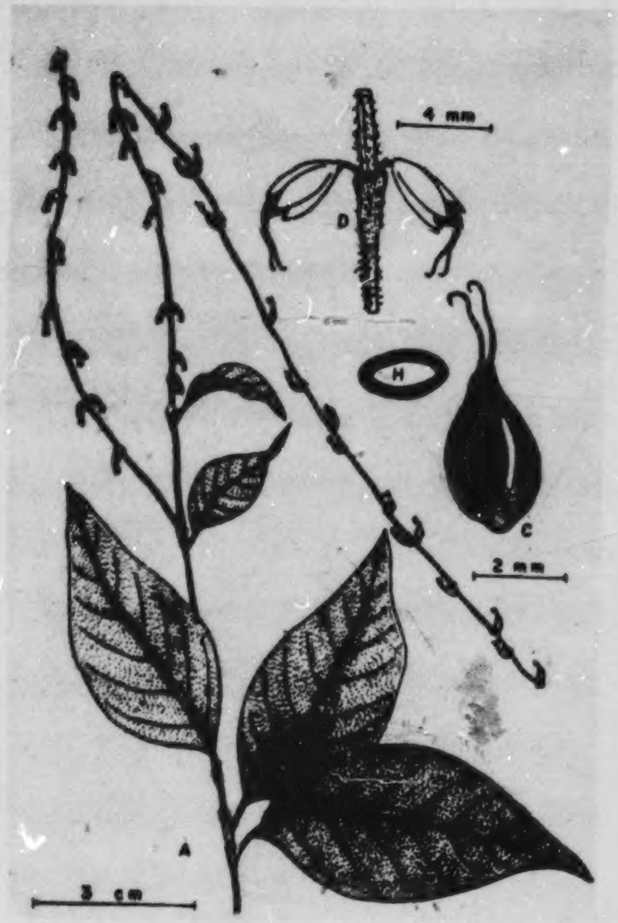
Meaning of Species Name. Of Virginiana.
Synonyms. Tovara virginiana (L.) Raf. in Fernald (1950).
Other Names. Virginia Knotweed.
Type of Plant. Perennial, from a thick knotty, subligneous rhizome.
Habitat. Rich woods, bottoms, and moist thickets.
Range. NH to Minn and Neb, s to Fla and Tex; also in India and e Asia.
Distr in NYS. Frequent across the state outside the higher Adirondacks.


3 mm
B
B
A
4 cm
A
var. dumetorum
var. cristatum
E
3 mm
3 mm
var. scandens

Polygonum scandens--Climbing False Buckwheat
[From Mitchell & Dean (1978), p. 27.]


H
2 mm
B
A
4 cm
D
4 mm

Polygonum tenue--Slender Knotweed
[From Mitchell & Dean (1978), p. 33.]



Polygonum virginianum--Jumpseed
[From Mitchell & Dean (1978), p. 31.]

Distr in the Torrey Range. Common throughout the range except in the pine barrens of NJ and the coastal plain of LI.
Elevation. Grows to 4000 ft in NC.
Time of Fr. Jul-Oct; Aug-Sep at Cornell.
Origin. Native.
Remarks. Upward pressure on the indurate style at maturity results in the projection of the achene to a distance of 3-6 ft.

Steyermark (1963) notes that "Some primitive peoples are reported to use the achenes which are mashed into a meal or flour said to possess somewhat the qualities of buckwheat flour."

Rumex L. Sorrel, Dock.

The genus *Rumex*, which includes the sorrels as well as the docks, contains some 150 species of biennial or perennial herbs of wide distribution but most abundant in the temperate zones. Most species have a stout rootstock and glabrous linear-lanceolate or oblong-lanceolate leaves, but the leaves of all species are highly variable even on the same plant. The numerous flowers are arranged in more or less crowded whorls, the whole forming a panicled raceme; they are generally perfect, with 6 sepals (3 outer ones and 3 larger inner ones which in fruit become further enlarged to enclose the single seed), 6 stamens, and a 3-sided ovary bearing 3 styles with much-branched or fuzzy stigmas. The fruit is a triangular nut enclosed by the 3 enlarged leathery inner sepals, one or all (or none) of which on the outside wall bear a "grain" or tubercle simulating a seed. While most of the Catskill species can easily be identified on sight, the best characters for identification are afforded by fully mature fruit. All our species bloom in summer and mature fruit in late summer or autumn. The freely produced flowers are not attractive enough for garden decoration but the dried fruiting spikes of some species are often used in winter bouquets. The name of the genus is the ancient Latin name of the dock. Most of the species are troublesome weeds, common by roadsides and in waste places, fields, and pastures, where they are often accidentally introduced with clover and grass seeds. Thirty or more species occur in the United States and Canada, about one-third of which are naturalized from the old world.

The Sorrels

Fortuitously, the first two of the Catskill species of *Rumex* listed below belong to a group of plants commonly known as the sorrels (not to be confused with the Wood Sorrel, *Oxalis americana*, a genus belonging to an entirely different family of plants), several species of which have acid leaves. *R. montanus*, French Sorrel, is cultivated in France for use as a salad plant; it is also an important article of diet in the extreme northern parts of Europe. The Norwegians eat the leaves with milk or mixed with meal and baked. In India this sorrel is used in soups and for imparting a peculiarly fine flavor to omelets.

R. acutus, another so-called French Sorrel, is occasionally grown in gardens for the sake of its leaves, which are used in salads. The plants are perennial and will remain productive for several years; owing to the acid taste of the leaves, however, they are not very popular in some areas. *R. alpinus*, Monk's Rhubarb, was early cultivated in Great Britain and was accounted an excellent remedy for ague.

"Sour docks" were considered formerly as a good accompaniment to boiled beef, either hot or cold, but this was a popular name, not for ordinary kinds of docks, but for the closely allied Garden Sorrel or Sorrel Dock, *R. acetosa*, whose herbage has a somewhat acid flavor. This, with its near relative, *R. scutatus*, the soup sorrel of the French, has been much cultivated as a potherb, particularly in continental Europe. It was formerly cultivated in English gardens as a spinach and the leaves were also used as a salad.

The Docks

The name *dock*, encompassing the rest of the species of *Rumex* that follow, is applied to a widespread tribe of broad-leaved wayside plants having roots possessing astringent qualities united in some with a cathartic principle, rendering them medicinally valuable as substitutes for Rhubarb, a plant of the same family. The docks were formerly ranked as members of the genus *Lapathum*, this name being derived from the Green *lapazein*, to cleanse, an allusion to the medicinal virtues of these plants as purgatives. The word still survives in the name of one of the species, *R. hydrolapathum*, Wild Rhubarb, a plant used for food in China. The young leaves and shoots of several species of dock may be eaten as potherbs, but they have a slight laxative effect.

Few of the docks have any horticultural value, most of them being regarded purely as troublesome garden weeds difficult to eradicate because the taproots penetrate deeply into the soil. The seeds are scattered far and wide by the wind, so that docks are found springing up in all parts of the garden and lawn, where they quickly become a nuisance. Docks growing on a lawn can be eradicated by piercing the centers with a skewer dipped in a weed killer or by spraying with 2,4D. Liming eliminates some kinds that grow only on acid soils. When spading them up, it is wise to make certain that every particle of root is removed, as the smallest pieces are capable of forming new plants.

The leaves of all the docks make wholesome boiled greens, cooking into a very soft mass and losing practically nothing in bulk, so that a small gathering makes a larger meal than most other greens. In order to eliminate the strong taste, the first one or two waters should be thrown off; and in order to prevent the greens from being too watery, the final cooking should be done with as little water as possible. Curled Dock, the common species with the leaves narrowed at base, remains tender until the flowers are well formed; but the common roadside and garden weed, *R. obtusifolius*, with the very veiny leaves round or heart-shaped at base, becomes very bitter after early summer.

The use of docks as potherbs is very old among European peoples, and some tribes of American Indians also used them. Docks are often gathered extensively by our Italian populace, but comparatively few other European stocks in America appreciate them. The American Indians, especially in the west, used the seeds of various docks in preparing meal; this would seem a practical use, since they are very closely allied to Buckwheat and bear fruits in abundance. Meal prepared from dock seed might well supply an emergency food.

Rumex aquaticus has properties very similar to those of the Curled Dock, *R. crispus*, including alterative, deobstruent, and detergent action. Its powers as a tonic are, perhaps, rather more marked than those of *R. crispus*. For internal use, it was given in an infusion, in wineglassful doses. Externally, it was used as an application for eruptive and scorbutic diseases, ulcers, and sores. As a powder, it has a cleansing and detergent effect upon the teeth. The roots of some species unite a laxative with their tonic and astringent properties, resembling Rhubarb somewhat in their operation.

The roots of Canaigre, *R. hymenosepalus*, native to the southwestern United States and Mexico, have been used for tanning in addition to the leaves being used as a potherb. In southern California it is extensively used as a substitute for the cultivated Rhubarb.

Rumex hydrolapathum, the Great Water Dock, the largest of all the docks, grows 7 feet in height and has leaves averaging 2 feet in length. This species is thought to be the Herba Britannica of the ancients, celebrated for the cure of scurvy and diseases of the skin. The root is strongly astringent; powdered, it was once used as a dentifrice. A decoction of the dried root was also formerly used as a stomach tonic, the astringent qualities of the root rendering it effective in the treatment of diarrhea, the seeds having also been used for the same purpose. It is sometimes planted in shallow water on the edges of large ornamental ponds for the beauty of its massive leaves.

Rumex crispus and *R. obtusifolius*, naturalized European weeds, are among the few adventive plants adopted by some of the Indians and used in medicine along with native species of *Rumex*. In 1785 the Rev. Manassah Cutler declared that the Indians used the root of Water Dock, *R. verticillatus*, with great success in cleansing foul ulcers and that they endeavored to keep it a secret from the Europeans. Choctaws sought to ward off smallpox by bathing in a decoction of this species. The "common dock" was a jaundice remedy among the Chickasaws, probably because of its yellow flowers. The Pimas used Canaigre Root (*R. hymenosepalus*) as a remedy for sore lips and sore throat. The same root was used as a remedy for diarrhea by the Wichitas and the Pawnees.

Within the last century a species of dock native to the American Southwest (*R. hymenosepalus*?) has been used by Navajo Indian weavers and dyers for coloring their rug and blanket yarns. The roots and leaves of this plant afford a yellow color that produces a "good duck's wing green" when combined with other dyestuffs. The roots of other docks have also been used for dyeing, including a musk color from *R. patientia* and an olive color from *R. aquatica*.

Key to the Catskill Species of Rumex

1. Leaves, or some of them, hastate or sagittate, with 2 spreading lobes at base of blade; plants dioecious; foliage acid to the taste, 2
    2. Plant spreading by long slender rootstocks; sepals of fruiting calyx not evidently enlarged in fruit.......... *R. acetosella*
    2. Plants without slender rootstocks; valves of fruiting calyx expanded into broad reticulate wings much exceeding the achene.. *R. acetosa*
1. Leaves narrowed, rounded, truncate, or cordate at base, not hastately lobed; flowers mostly or all perfect; foliage not strongly acid, 3
    3. Enlarged and prominent grain on none or only 1 valve (valves entire or merely dentate or denticulate), 4
        4. Mature valves reniform, broadly rounded at summit, definitely broader than long; all midribs without grains or with 1 small rudimentary grain...................... *R. longifolius*
        4. Mature valves broadly ovate to ovate-orbicular, tapering to ovate or subacute tip, as long as or longer than broad, 5

5. Leaves plane or nearly so; those of basal rosette and base of stem 2-18 cm broad, mostly with broadly rounded to cordate bases; one valve with large and plump grain...... R. patientia
5. Leaves with crumpled and crisped margins; those of basal rosette and base of stem 1.5-8 cm broad, narrowed to base; valves with 1-3 prominent grains.......................... R. crispus

3. Valves bearing 1-3 conspicuous grains, 6
   6. Margins of valves entire, dentate, or undulate, 7
      7. Leaves lanceolate or linear-lanceolate, not crisped, subentire, pale green and glaucescent; pedicels jointed very near the base................................ R. triangulivalvis
      7. Leaves lanceolate to oblong, dark green, not glaucescent; pedicels jointed 1/4 to 1/3 their length above the base (leaves crenate, crisped on the margin)................ R. crispus
   6. Margins of the valves with a few long, slender, spinulose or bristle-form teeth, 8
      8. Well-developed grain 1, those of the other valves none or poorly developed; valves with stiff spinose teeth less than to about equaling breadth of valve; plants perennial (upper verticils contiguous; pedicels much longer than the fruit; surface of the grain minutely wrinkled; basal leaves warm green with red veins, crenulate).................. R. obtusifolius
      8. Well-developed grains 3, finely areolate; valves with bristle-form teeth longer than the breadth of valve; plants annual or biennial (grains narrowly lanceolate, tapering to the summit, 0.3-0.4 mm wide, not concealing the projecting sides of the valve).................. R. maritimus

Rùmex acetòsa L. Garden Sorrel.

Meaning of Species Name. An old generic name.

Other Names. Green Sorrel, Sour Dock, Sharp Dock, Summer-grass, Sourgrass, Green Sauce, Meadow Sorrel, English Sorrel, Cock Sorrel, Red-shank, Tall Sorrel.

Type of Plant. A perennial herb, reproducing by seeds and creeping roots, according to Muenscher (1952).

Habitat. Fields, old pastures, meadows, roadsides, and waste places, particularly on moist alluvial soil.

Range. Gl and Nf to Ak, s to NY and Pa; also in Asia.

Distr in NYS. Common as a weed throughout most secs of the state but less common on LI.

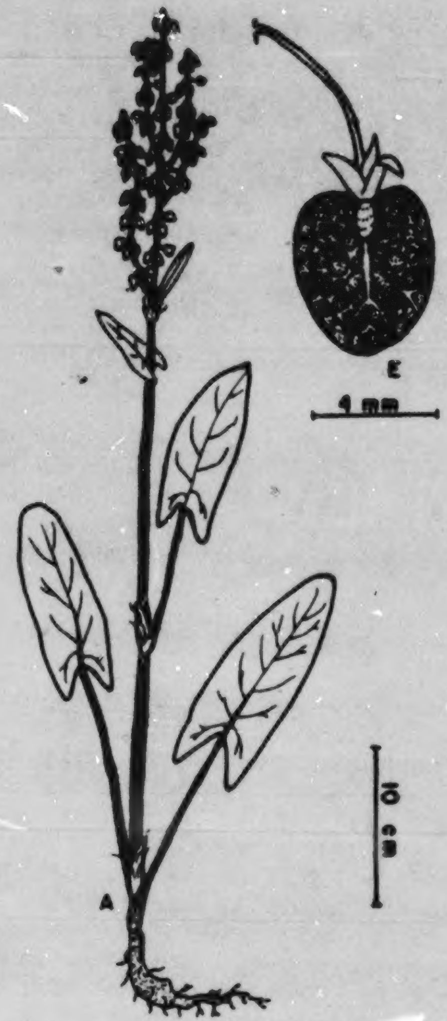
Distr in the Torrey Range. Local as a weed.

Time of Fr. Jun-Sep.

Elevation. Has been collected at 1920 ft in Ulster co.

Origin. Natzd from Eu, but said to be native across the n part of NAm.

This plant is a hardy perennial, native to Great Britain, Europe, and Asia, and is found throughout the north temperate zone. The use of Garden Sorrel goes back at least to 2000 B.C., since the Egyptians used it in combination with other greens both as a spinach and as a salad plant. The Romans used to eat a salad of lettuce and sorrel as an appetizer before a heavy banquet, and, using the sorrel sparingly, this makes an excellent salad even



Rumex acetosa--Garden Sorrel
[From Mitchell & Dean (1978), p. 6.]

for today. It has diuretic properties (though only mildly so), and for this reason Roman physicians also employed it as a medicine.

This plant was formerly cultivated in Britain in the time of Henry VIII, where it was held in great repute as a spinach and as a salad plant, its leaves having an agreeably sour taste. The sour flavor comes from its acid content, since it contains citric, tartaric, and oxalic acids, among others. Evelyn wrote that "in making of sallets [it] imparts a grateful quickness to the rest as supplying the want of oranges and lemons." In Great Britain, country people used to beat the herb to a mash; mixed with vinegar and sugar, it was used as a sauce with cold meat (hence one of its popular names, Green Sauce), often served with beef and mutton; it also makes an excellent accompaniment for roast goose or pork instead of applesauce. For additional flavor sorrel can likewise be cooked with other greens, such as cabbage, lettuce, and beet tops, and it is said to improve the taste of Spinach remarkably. It is also good in omelets. Because of their acidity, the cooked leaves likewise make a capital dressing with stewed lamb, veal, or sweetbreads. A few leaves may also with advantage be added to turnips.

Sorrel is mentioned in nearly all the earlier botanies as under culture in England, and it was in common use in 1807; but by 1874 it had been for many years almost entirely discarded, the French Sorrel having usurped its place. It is still used to a great extent for salads in France, however, as well as being an ingredient in ragouts, fricassees, and soups. In Ireland it is largely consumed by the peasantry with fish and milk, and it seems to be particularly relished by the Hebrideans. It is mentioned as a cultivated plant in American gardens in 1806 and again in 1832. The seed was still offered by some American seedsmen in 1919, who listed it under the name Garden Sorrel.

Fresh Garden Sorrel can be had even in winter if the roots are boxed in the cellar, kept in a dark situation (the darker the better), watered, and allowed to sprout. The self-bleached new growth of varying shades from white to pink makes a beautiful and delicious addition to salads. In his Tour of Iceland, Sir William Hooker says of this species: "A beverage is made by the common people, by steeping the plant in water till all the juice is extracted. This drink is kept some time; but it soon becomes bad and putrid in warm weather." The Laplanders boil a large quantity of the leaves in water and mix the juice, when cold, in the milk of their reindeer. This they esteem an agreeable and wholesome food, for the juice of the leaves coagulates milk as well as does rennet. In Scandinavia the plant has been used in times of scarcity to put into bread. In Norway the leaves are used to obtain a greenish-yellow dye; for this purpose they can be used all summer but are best in spring.

The leaves, both dried and fresh, have been used medicinally, and they at one time held a place in both the London and Dublin pharmacopeias. The medicinal action is refrigerant and diuretic, and it has been employed as a cooling drink in febrile disorders. The leaves contain a considerable quantity of bioxalate of potash, which gives them their medicinal and dietetic properties. It is corrective of scrofulous deposits and is especially beneficial in scurvy. Both the root and the seed were formerly esteemed for their astringent properties and were employed to arrest hemorrhage. The juice of the plant, with a little vinegar, was considered a cure for ringworm and recommended as a gargle for sore throat. A decoction of the flowers, made with wine, was said to cure jaundice and ulcerated bowels, the root in decoction or powdered being also employed for jaundice as well as gravel and stone in the kidneys.

Garden Sorrel grows freely in any good garden soil and is propagated either by seeds or by dividing the roots during the early part of spring. The leaves, when fully grown, are gathered singly. As soon as they appear, the flowering shoots are cut out; they rob the plants of nourishment and prevent the leaves from reaching their maximum size. Improved garden varieties of this species are available and are much superior to the wild plant.

In some areas this plant may be considered as an undesirable weed. Muenscher (1952) states that in gardens it can be controlled by hand pulling or hand hoeing, care being taken to extract all the root. Scattered plants in pastures can be pulled by hand, and crop rotation on old meadows should bring it under control in such areas.

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Rumex acetosella L. ssp. angiocarpus (Murb.) Murb. Sheep Sorrel.

Meaning of Species Name. An old generic name meaning Little Sorrel; ssp. name, covered fruit.

Other Names. Red Sorrel, Common Sorrel, Field Sorrel, Wood Sorrel, Sour Dock, Sour-grass, Sour-leek, Mountain Sorrel, Gentleman's Sorrel, Horse Sorrel, Cow Sorrel, Toad Sorrel, Red-weed, Sour-weed, Redtop Sorrel.

Type of Plant. Annual or perennial, reproducing by seeds and slender creeping rootstocks.

Habitat. A ubiquitous weed of sterile fields and sour soils of fields, pastures, hillsides, lawns, meadows, and waste places.

Range. Almost throughout the US and Canada; also in Asia.

Distr in NYS. Locally frequent across the state; said to be native in the w states, but in NYS apparently natzd from Eu.

Distr in the Torrey Range. Abundant as a roadside and field weed.

Elevation. Observed on the summit of Slide Mt at 4100 ft in Ulster co.

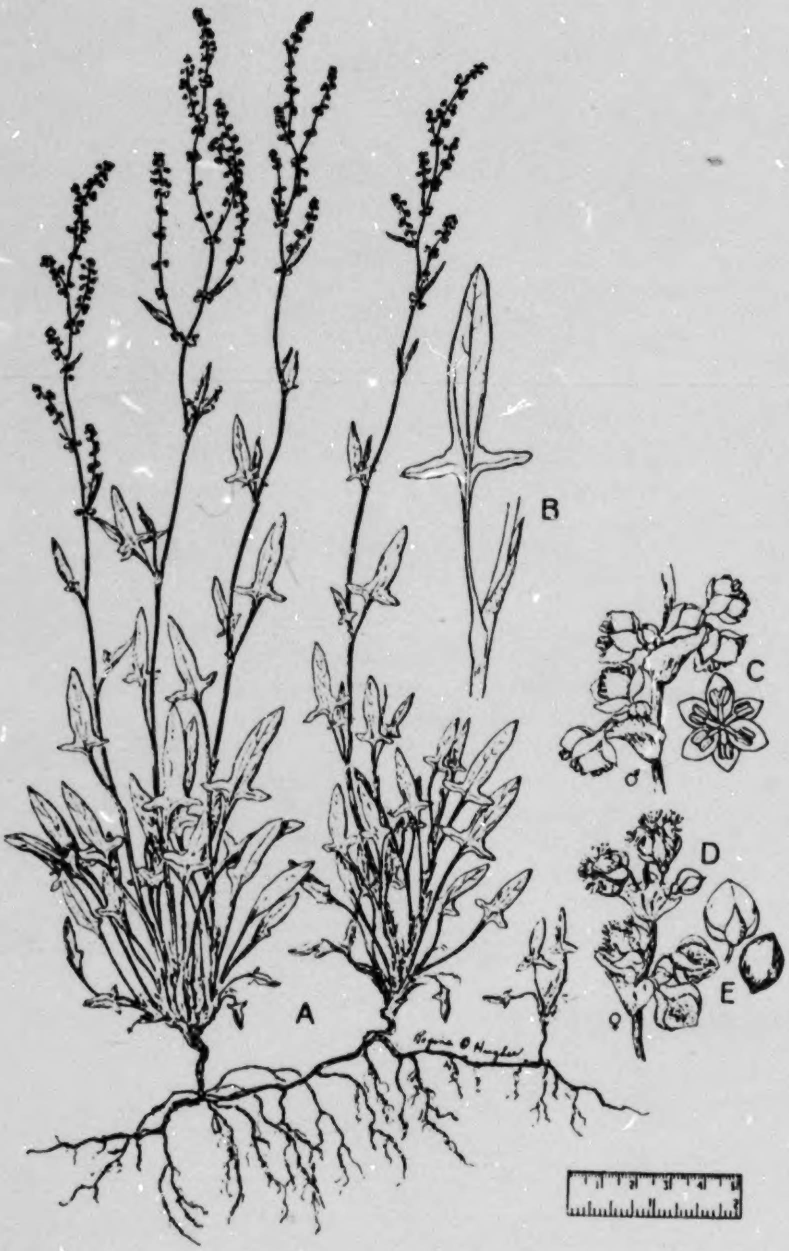
Time of Fr. Jun-Oct; Jun-Sep at Cornell.

Origin. Natzd from Eu in large part.

Remarks. Sometimes a troublesome weed; difficult to eradicate except by sweetening the soil. Persists in areas of poor drainage and low soil fertility.

This species is a common weed in fields and gardens everywhere and has been known for centuries in Europe as a potherb. It is said that in England in very early times this plant was cultivated for its leaves, just as Spinach is today. The plant in question, however, may well have been R. acetosa instead of this one. Sheep Sorrel has an agreeably sour taste and is a popular nibble with children; it is also familiar to most hikers as a practical thirst-quencher. The acidity is due to the presence of potassium oxalate, which, if eaten in excess, may be detrimental, for, taken in large doses, the leaves are said to have produced poisonous effects. Ordinary small nibblings of the fresh plant are quite safe, however, as well as refreshing; when boiled, the sorrels seem to be harmless. It was used by the early settlers in soups, sauces, and mixed with other greens in salads. It is a readily available and attractive base for a puree, a small amount of the tender growth, after boiling, being mashed through a strainer and added to rice water, milk, or other stock, thickened with flour and butter, and seasoned to taste. The fresh leaves also make an unusual seasoning for fish, rice, or potatoes.

To make sorrel soup, wash well a quantity of sorrel and put in a saucepan with a little water, but do not cover. Cook slowly for about half an hour. Then take 4 cups of milk to which small pieces of white onion have been added. Cook this in a double boiler, adding 2 teaspoons of butter and 2 tablespoons of flour thoroughly blended to avoid lumps. Let this mixture stand after it has been cooked for a while and then add the mashed sorrel mixture; strain, and season to taste. The quantity of sorrel or other fresh greens to use in this or similar soups depends upon the taste. Various recipes recommend "a small bunch," "a half handful," or "a good bunch." Trial and error and your own taste will determine what you will eventually call "a quantity." The above recipe can also be used for soups made from other wild plants such as Dandelion, Water Cress, Stinging Nettles, and the like. A



Rumex acetosella--Sheep Sorrel
[From USDA Agr. Research Sv. (1971), Fig 62, p. 129.]

sorrel sauce can be made by working a liberal amount of butter into a purée, adding pepper, salt, and a little sugar, and thickening with brown sauce (rous). This is a good accompaniment to veal and other meat.

This plant can also be used to make a sour thirst-quenching, hot or cold drink by cleaning the leaves and simmering them for 20 minutes in plenty of water; the flavor of this drink, sweetened to taste, somewhat resembles that of lemonade (soda water can be added if desired to make a carbonated drink). This drink was at one time sometimes used in the treatment of fevers.

The whole herb was formerly employed medicinally in the fresh state, it being used as a diuretic, refrigerant, and antiscorbutic (characteristics also of *R. acetosa*), and the juice extracted from the fresh plant was considered of use in urinary and kidney diseases. Steyermark (1963) observes that "Some individuals are sensitive to the plants, receiving a dermatitis through contact," adding also that "This species sheds large amounts of pollen in May and June, and is considered as a cause of hay fever."

This species is by far the most important member of this genus in so far as wildlife is concerned, partly because it is one of the most abundant weeds in the whole country. Both seeds and leaves are consumed. The small triangular seeds are a common item in the diet of such ground-feeding birds as ruffed grouse, red-winged blackbirds, and song sparrows. Cottontail rabbits also consume its leaves.

In Lapland the whole plant is used to obtain a light grayish-pink. A peck of plant material, to which water and alum are added, is soaked for 2 to 3 weeks in a large wooden bowl. The yarn is then added and left in the bath for a couple of days, stirring from time to time to get an even color. When the desired shade has been achieved, the yarn is hung up to dry without rinsing. This plant has also been used to dye woolens black, and from the roots alone a musk color can be derived.

This plant is frequently considered as an indicator of acid soil, but it also thrives on neutral or slightly alkaline soils. In many areas it is a noxious weed. In cultivated areas Muenscher (1952) states that it can be brought under control by clean cultivation. In old meadows, a short crop rotation is effective. Fertilizer should also be applied, especially nitrogen.

Rumex x *acutus* L. Acute-leaved Dock.

Meaning of Species Name. Acute, from the sharp-pointed leaves.

Type of Plant. A perennial herb.

Range. Occasional where the ranges of the two parents coincide.

Distr in NYS. House (1924) simply states that a large number of hybrids of *R. crispus* have been described in European literature, some of which should be looked for in this country.

Distr in the Torrey Range. Not listed in Taylor (1915)

Elevation. Has been collected at 1400 ft in Delaware co.

Time of Fr. Jul-Aug.

Origin. Both parents are natzd from Eu, but the hybrid develops locally.

Remarks. This hybrid between *R. crispus* and *R. obtusifolius* has so far been collected only once in the Catskills, but it is quite possible that it occurs more frequently than current records indicate.

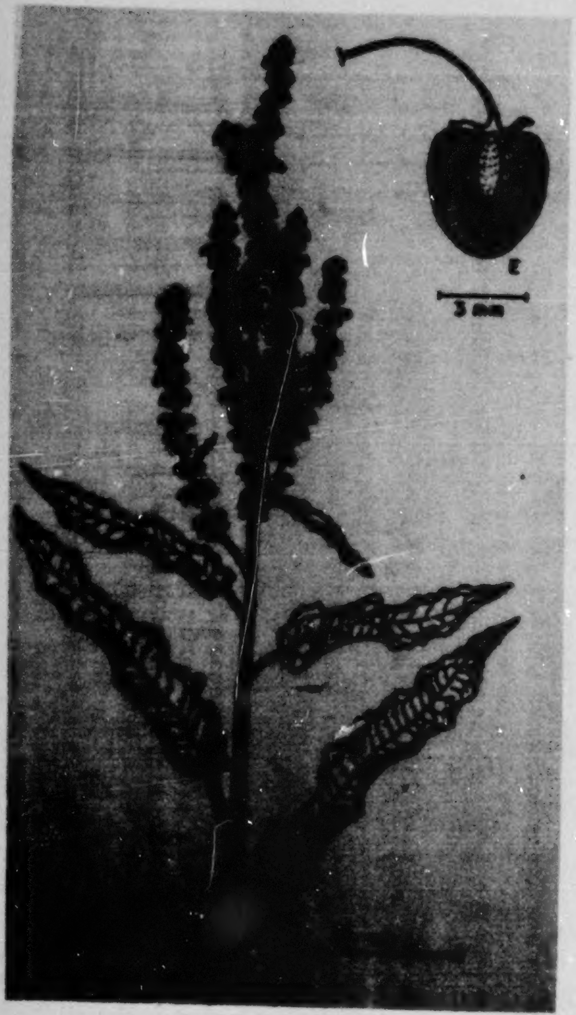
Rumex crispus L. Curled Dock.

Meaning of Species Name. Curled, from the wavy margins of the leaves.
Other Names. Sour Dock, Yellow Dock, Narrow Dock, Narrow-leaved Dock, Curly Dock.
Type of Plant. A perennial herb, reproducing by seeds.
Habitat. Roadsides, pastures, fields, meadows, lawns, and waste places.
Range. Throughout the US and adjacent Canada.
Distr in NYS. Common
Distr in the Torrey Range. Abundant as a troublesome weed in most parts of the range.
Time of Fr. Jun-Sep; Jun-Sep at Cornell.
Origin. Natzd from Eu.

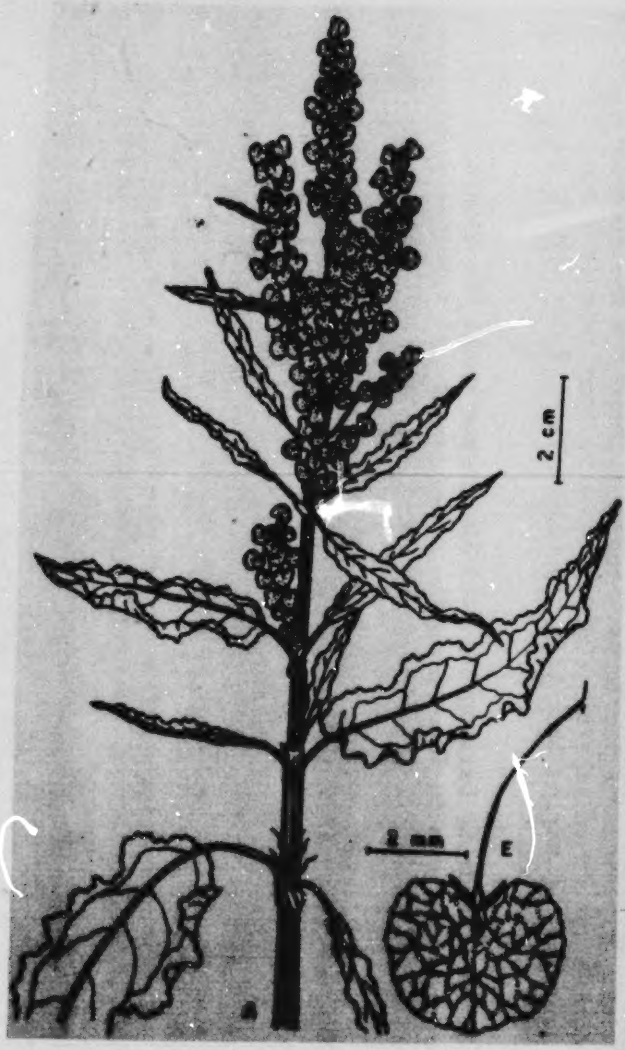
Curled Dock is a native of Eurasia but was early introduced into America, where it made itself quite at home and has since spread nearly throughout the United States and southern Canada. Most of the docks are useful as wholesome greens when young, but many people think that this one is superior to the others, and some go even so far as to say that it excels Spinach and other cultivated greens. The tender young leaves can be gathered in early spring and cooked in any way one would use Spinach. Dock leaves lose less bulk in cooking than most leafy vegetables; a comparatively small quantity will therefore make a sizeable dish of greens. Many people like to combine dock with other wild greens, such as Dandelion, Watercress, Wild Mustard, or Winter Cress, usually available while dock is still at its best. Cook the greens in very little water for about 15 minutes, then drain, chop, and season with salt, pepper, and butter, together with any combination of minced onion, crumbled bacon fried crisp, or sliced hard-boiled egg. Many people also like to add a little vinegar. If dock greens are considered too bitter, they can be cooked in two waters, pouring off the first after it has come to a good rolling boil.

Some people dislike the slight astringency in dock greens and prefer them creamed, for the protein in milk combines with the tannin in the leaves and removes all traces of astringency. To cream 2 cups of chopped greens, melt 1 tablespoon of butter in a saucepan, add 1 tablespoon of flour, and mix thoroughly. Slowly add 1/2 cup of milk a little at a time and cook until slightly thickened, add the greens, stir, and continue to cook until well mixed. Add salt and pepper to taste.

The long yellow root of Curled Dock, both fresh and dried, has been used in medicine for many centuries as a mild astringent, bitter tonic, gentle laxative, and stomachic. The root was gathered in early fall after the fruit was ripe but before frost killed the plant. After digging, they were thoroughly scrubbed, the side roots trimmed off, the main root split into halves, and the pieces laid on paper, rounded side down, and dried in an airy room. Preparations made from the dried root were largely prescribed for "diseases of the blood," from "a spring eruption" to scurvy, scrofula,



Rumex crispus--Curled Dock
[From Mitchell & Dean (1978), p. 17.]



Rumex longifolius--Yard Dock
[From Mitchell & Dean (1978), p. 16.]

and chronic skin diseases. It was also found useful in the treatment of jaundice, piles, "bleedings of the lungs," and as a tonic for the stomach and the digestive system in general. One old book on home remedies even prescribed dock greens, saying that they "should be eaten every spring to thin and purify the blood."

An ointment, made by boiling the root in vinegar until the fibers were softened and then mixing the pulp with lard, was applied externally for skin eruptions, particularly the itch and boils, in the cure of which it at one time enjoyed considerable reputation. This ointment was also used to treat mange, saddle sores, and other skin disorders of animals. The powdered root was recommended as a dentifrice, especially when the gums were spongy. The powdered root of a closely related species has a reputation for "bracing up loose teeth and spongy gums."

The Indians learned the medicinal uses of this European plant from the early settlers; Lighthall (n.d.), a noted Indian medicine man, reported that it was "a favorite blood purifier with Indian doctors," used freely "in cases of bad blood and eruptions and diseases of the skin." "I think more of it in the treatment of scrofula," he stated, "than any other one remedy in the vegetable kingdom." He prepared his medicine simply by filling a quart bottle half full of the green root cut up fine, filled the bottle with "good whiskey," and let it stand for 14 days, when it was ready for use. His dose was "a tablespoonful two or three times a day." The Teton Dakotas bound the crushed leaves of R. crispus to boils to bring suppuration and to other sores as a healing agent. The roots, which contain tannin, were used by the Flambeau Ojibwas for closing and healing cuts. Densmore (1928) states that the Chippewas made medicinal use of this species in treating eruptions of the skin, cuts, and swellings. The "Dried and powdered root is moistened, spread on a cloth and applied as a poultice in cases of great itching of the skin and eruptions," especially for children. As a poultice, the root "would cure a swelling in one day if there were no suppuration," though the dried and powdered root was also used in treating cuts and ulcerous sores. This species was listed in the U.S. Pharmacopeia, 1863-1905, and in the National Formulary, 1916-36. It was first used for the treatment of skin diseases and for alterative and depurative purposes; later it was used as a laxative and tonic. Krochmal (1968) includes this species in a list of plants still currently in demand by drug companies.

Home remedies prepared from the dried roots of this plant were almost equally simple and certainly effective in many cases. The usual medicine administered was a tonic prepared as a simple infusion made by pouring 1 pint of boiling water over 1/2 ounce of finely shaved root, allowing it to cool, then straining the liquid. A wineglassful was prescribed a half hour before breakfast to act as a gentle laxative, to tone up the system, and to stimulate the appetite. To make a syrup, 1/2 pound of the shaved root was boiled in 1 pint of water until it was reduced by half. The resulting liquid was then strained and added to 1 cup of honey and mixed thoroughly. One teaspoonful, taken whenever needed, was considered an excellent remedy for coughs, tickling throat, or a mild irritation of the upper bronchial passages.

Before the middle of the 19th century disease and body chemistry were little understood, but centuries of experiment had resulted in practical ways of treating many disorders without knowing why their prescriptions were effective. The use of the roots of this plant in the treatment of certain disorders is a case in point. In colonial times and before, winter diets often consisted largely of dried and salted foods, so acute vitamin C deficiencies were likely to occur, commonly resulting in advanced cases of scurvy by spring. While there is no evidence that the blood ever needs "thinning," certain toxins in the body are ordinarily eliminated by first combining them by means of ascorbic acid, or vitamin C. Dock greens and roots, being rich in vitamin C, would supply this deficiency and cure bodily ailments caused by it, even to tightening loose teeth, one of the symptoms of scurvy. Dock greens are richer in vitamin C than orange juice and contain four times as much vitamin A as carrots, in addition to supplying calcium, phosphorus, iron, and potassium. Other species of dock also occur in the Catskills; the young leaves of all of them can be eaten or used in medicine.

In Scotland the fresh roots are used to obtain a black dye. After washing the roots well, they are cut up and boiled for 2 hours. The mixture is then strained, a little chrome is added, and the wool is boiled in the dye bath for half an hour before being hung up to dry.

In areas where this species has become a troublesome weed in lawns and gardens, remove scattered plants, including all roots, with a hoe, trowel, or spud. Where meadows may have become overrun, resort must be had to the plow, followed by a cultivated crop.

Kingsbury (1964) states that this species, together with Garden Sorrel and Sheep Sorrel, has been suspected for many years of producing occasional livestock loss in several countries. A number of cases of poisoning in sheep have occurred in Australia, New Zealand, and in England, where sheep grazed in a pasture where little else was growing. Cooking, however, removes all traces of the toxin, so there is no danger from preparing this plant for the table or using it in home remedies.

Rumex longifolius Lam. Yard Dock.

Meaning of Species Name. Long-leaved.

Synonyms. *R. domesticus* Hartm. in Fernald (1950); *R. patientia* L. in Gleason (1952).

Other Names. Herb Patience, Blunt-leaved Dock, Patience, Spinach Dock, Garden Patience, Passions, Monk's-rhubarb.

Type of Plant. A perennial herb, reproducing by seeds.

Habitat. Fields, roadsides, waste places, etc., often on rich loamy soil.

Range. Nf to NE and NY and less often to Wis.

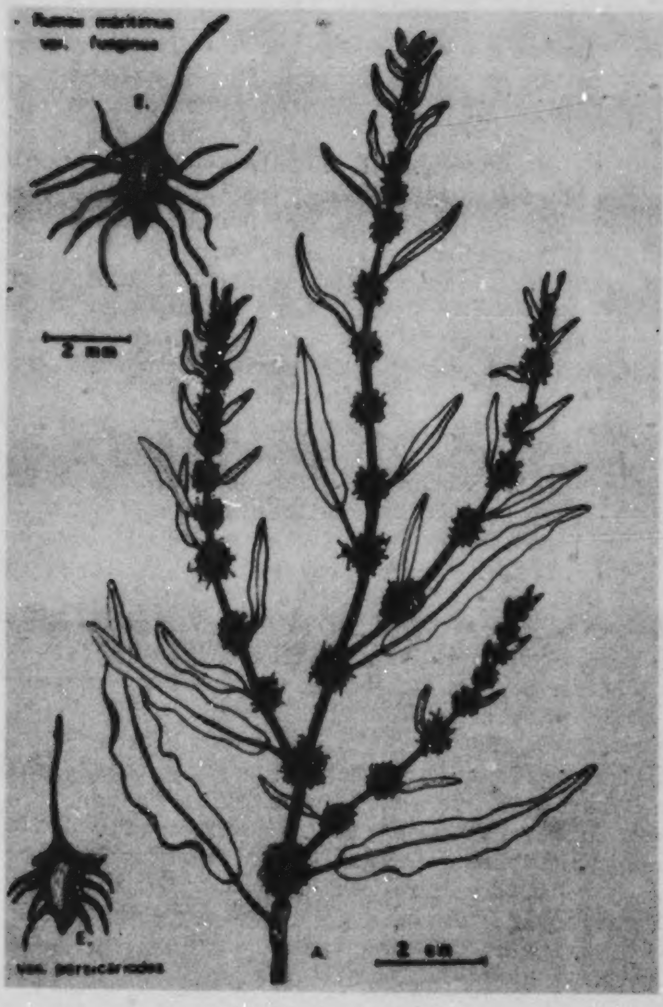
Distr in NYS. Frequent throughout the state, especially northw and westw.

Distr in the Torrey Range. Locally as a weed.

Time of Fr. Late Jun-Oct; Jun-Jul at Cornell.

Origin. Natzd from Eu.

One of the largest of our docks, the Yard Dock was long a popular garden vegetable in Europe, cultivated as a spinach plant. It was known to Pliny, and P. S. Pallas, writing in 1793-1794, stated that the young leaves



Rumex maritimus--Golden Dock
[From Mitchell & Dean (1978), p. 9.]

were eaten with avidity by the Greeks of Crimea. In 1865 B. Seeman reported that immediately they appear above the ground, and indeed, throughout the summer, the leaves of this plant were eaten by the Eskimos of the west, by handfuls, as an antiscorbutic. Yard Dock was introduced into England in 1573 as a garden vegetable and was included among American esculents in 1806 and again in 1832. But while it may at one time have been cultivated in this country, it is never seen in the supermarkets of today. Nevertheless, the acidic leaves of this tall-growing plant can be used as a substitute for Spinach, prepared in the same manner as those of Curled Dock.

The Meskwakis are said to have boiled the root of this species for a poison antidote, while the Potawatomis used the same article for a blood purifier.

Occasionally this plant becomes a troublesome weed. It can be controlled by pulling out or extracting individual plants with a spud, making sure to get all the root.

Rumex maritimus L. var. fueginus (Phil.) Dusen. Golden Dock.

Meaning of Species Name. Maritime.
Type of Plant. An annual herb.
Habitat. Shores, streambanks, wet ground, waste places, and cult ground, usually avoiding acid soils.
Range. Along the coast from e Que to NJ and NC; inland w to the Pacific, s to O, Ark, and NM; also widely distr in Eu and SAm.
Distr in NYS. Eastern shore of Great Pond and Montauk Pond, LI, as given by House in 1924.
Distr in the Torrey Range. Not listed in Taylor (1915)
Elevation. Has been collected at 1400 ft in Delaware co.
Time of Fr. Jul-Aug.
Origin. Adv from Eu.
Remarks. Infrequent.

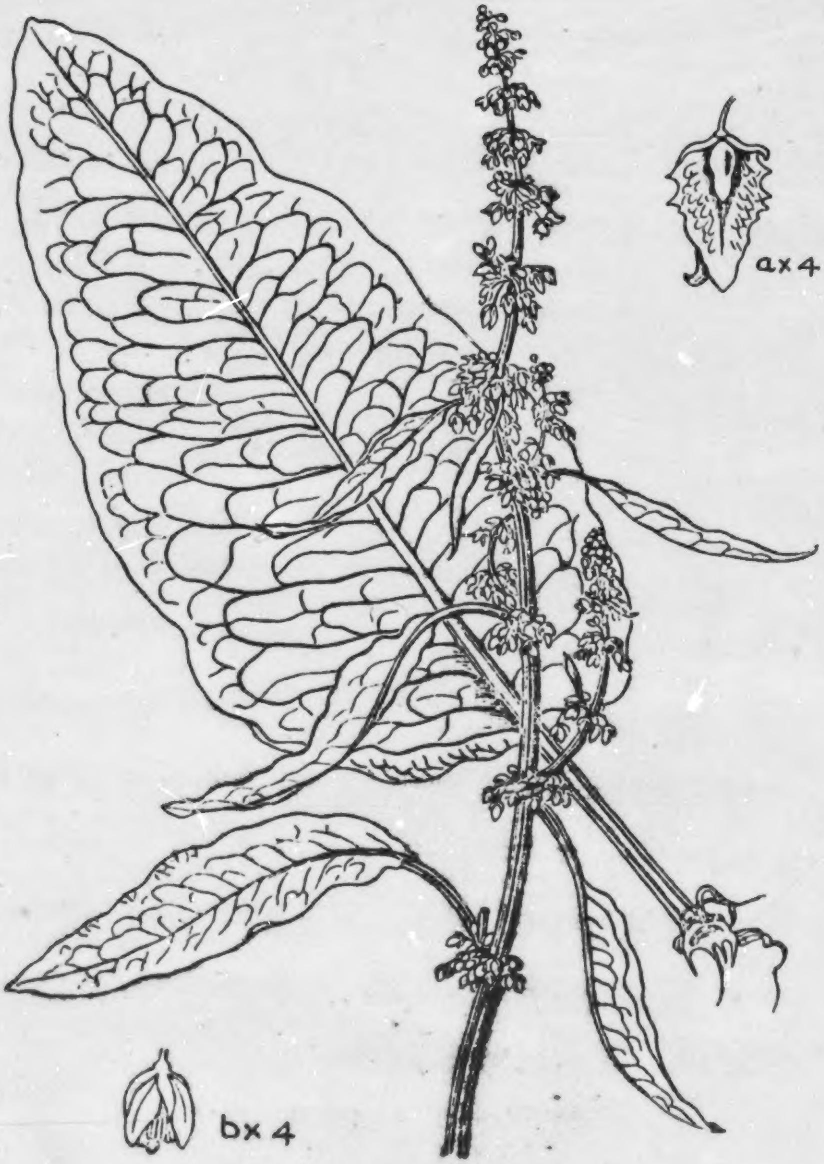
Rumex obtusifolius L. Bitter Dock.

Meaning of Species Name. Blunt-leaved.
Other Names. Blunt-leaved Dock, Red-veined Dock, Broad-leaved Dock, Butter Dock, Celery-seed, Broad Dock.
Type of Plant. A perennial herb, reproducing from seeds and new shoots from the roots.
Habitat. Fields, pastures, lawns, waste places, and roadsides, usually in rich moist or shaded soil.
Range. Que and NS to BC, s to Fla and Ariz.
Distr in NYS. A common weed throughout the state.
Distr in the Torrey Range. Locally abundant as a weed.
Time of Fr. Jun-Sep; Jul-Sep at Cornell.
Origin. Natzd from Eu.

This plant has also been recommended for greens. In many respects it is quite similar to Curled Dock, but it has a more bitter taste.

The leaves have been applied as a rustic remedy to burns and scalds and used for dressing blisters, serving also as a popular cure for nettle stings. A decoction of the bitter root was also considered efficacious in obstinate cases of some types of skin disease, and when taken internally in large quantity, it acts as a purgative. A tea made from the root was formerly given for the cure of boils, but the use of this species in medicine was never so widespread as that of R. crispus, though it is more bitter. The Chippewas used the root of this species also in the treatment of cuts, ulcers, and skin eruptions, having no doubt learned of its medicinal applications from the whites. In Great Britain this plant is frequently called Butter Dock because its large cool leaves have in the past often been used in the country for wrapping butter for the market. This species was official in the U.S. Pharmacopeia, 1820-1905; it was used in the treatment of skin diseases and for alterative and depurative purposes; later it was used as a laxative and tonic.

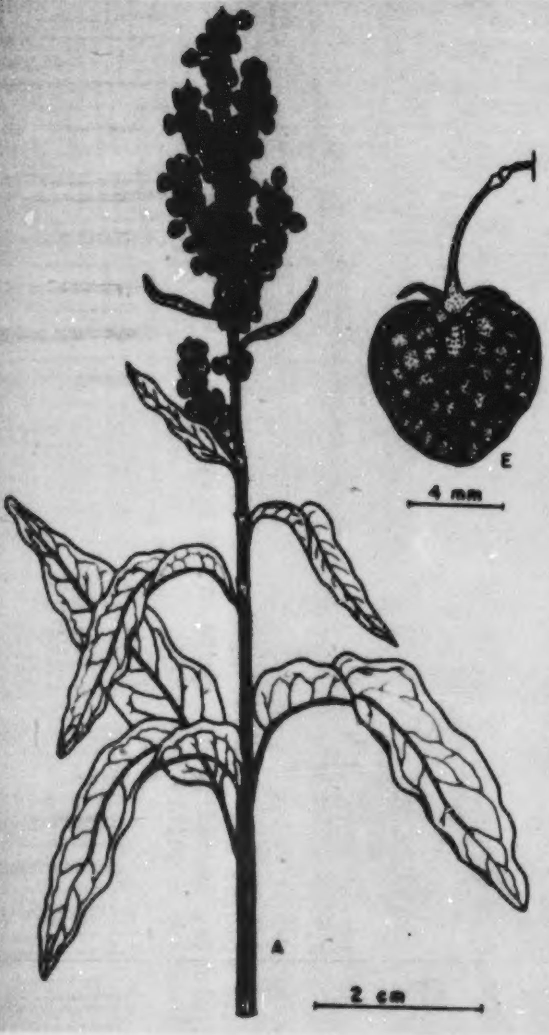
The roots of this species will dye woolens a dark yellow when used with an alum mordant. To prepare the dye, about 1/2 pound of the chopped fresh roots was soaked over night, then boiled for 1 hour, after which the



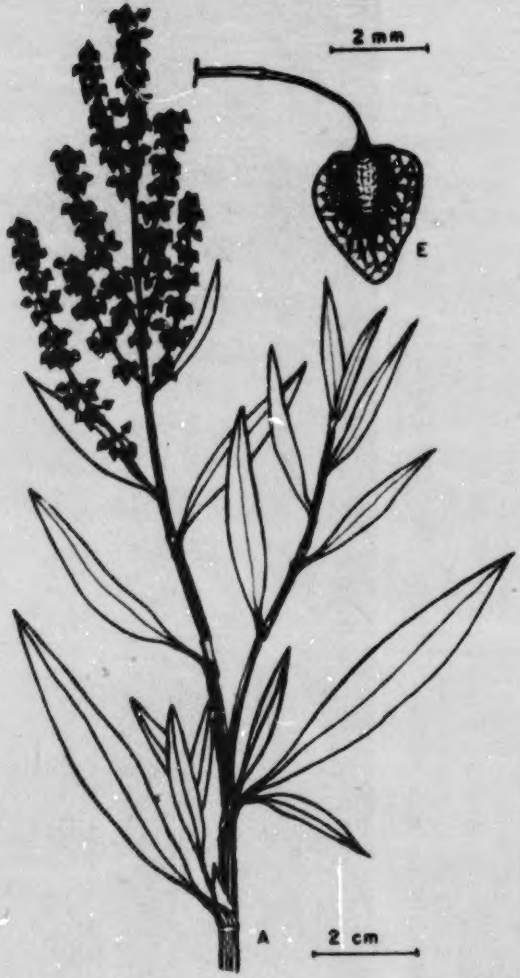
Rumex obtusifolius--Broad-leaved Dock
[From Long (1938), Fig 85, p. 177.]

liquid was strained to make 4 to 4 1/2 gallons of dye bath. One pound of mordanted and wetted wool was then put into the lukewarm dye bath, heated to the boiling point, and simmered for 1 hour, after which it was rinsed well and dried in the shade.

This species sometimes becomes a troublesome weed. Muenscher (1952) suggests that in pastures and lawns, scattered plants should be removed with a spud, including all roots. If fields are overrun, plow, followed by a cultivated crop. In some areas it may also help to improve the drainage.



Rumex patientia--Patience Dock
[From Mitchell & Dean (1978), p. 19.]



Rumex triangulivalvis--Willow-leaved Dock
[From Mitchell & Dean (1978), p. 14.]

Rumex patientia L. Patience Dock.

Meaning of Species Name. An old colloquial name.

Other Names. Patience, Blunt-leaved Dock, Herb Patience.

Type of Plant. A perennial herb, reproducing by seeds.

Habitat. Roadsides, waste places, and rich thickets.

Range. NE to Minn and westw, s to Pa, Mo, and Okla.

Distr in NYS. Frequent throughout the state, especially northw and westw.

Distr in the Torrey Range. Locally as a weed.

Time of Fr. Mid-Jun-Jul; Jun-Jul at Cornell.

Origin. Natzd from Eurasia.

This species (which has also been called *R. domesticus*) has long been confused with *R. longifolius* so that it is almost impossible in checking the literature to know which of the two plants an author is talking about. They are almost identical in appearance except that this plant exhibits a large, well-developed tubercle on one of the valves of its fruit while that of *R. longifolius* has none. In any case, *R. patientia* has so far been collected only twice in the Catskills; it is *R. longifolius* that is the more common.

Rumex triangulivalvis (Danser) Rech. f. Willow-leaved Dock.

Meaning of Species Name. Triangular-valved.

Synonyms. *R. mexicanus* Meisn. in Fernald (1950) and in Gleason (1952).

Other Names. White Dock, Pale Dock.

Type of Plant. A perennial herb, reproducing by seeds.

Habitat. Moist rich soil, sometimes brackish, of meadows and waste places.

Range. Que to BC, s to NY, Pa, Ky, O, Ind, Ill, Mo, Tex, NM, Mex, and Cal.

Distr in NYS. Occasional as a weed in s NYS.

Distr in the Torrey Range. Occasional in waste ground.

Time of Fr. Jul-Sep; Aug-Sep at Cornell.

Origin. Native.

Remarks. Our plant should be considered as distinct from the Mexican form, *R. mexicanus*.

Where this species may have become a weed in pastures and lawns, remove scattered plants, including all roots, with a spud; if fields are overrun, plow, followed by a cultivated crop.

REJECINDAE

The botany office at the New York State Museum has for years maintained for each of the counties making up New York State an informal, up-to-date checklists of all plants known to occur in the county. Admittedly, these checklists are not complete, in part because there has not been time to check all herbaria where specimens from the state have been filed and in part because botanical exploration constantly turns up species previously unrecorded, but these lists do provide all the information currently available on what plants grow in each of the several counties of the state.

As mentioned in the introduction to Section I, however, the Platt list of 1840 was used as one of the sources in compiling a checklist of the plants occurring in Delaware County, although none of the Platt specimens has survived and there is no evidence that the plants studied were confined to those collected in Delaware County. The Platt list, comprising 380 species, contains 28 species of the Catskill Apetalae, 3 of which have neither since been collected in Delaware County, nor are there any records of their occurrence in the Catskill region:

Salix viminalis
Quercus palustris
Cannabis sativa

These species are therefore rejected both from the checklist for Delaware County and as elements constituting part of the Catskill flora until such time as more specific evidence is found that they occur in this area. _Cannabis sativa_ has sometimes been planted in the Catskills, but there are no records of its occurring spontaneously.

LIST OF ABBREVIATIONS

The following abbreviations are used primarily in the "plant biographies" and in the Appendix, for the most part without periods:

adv, adventive
Afr, Africa, African
Ak, Alaska
Ala, Alabama
alt, altitude
Alta, Alberta
Am, America, American
Apr, April
Ariz, Arizona
Ark, Arkansas
Aug, August
Austr, Australia
BC, British Columbia
BW, black-and-white photograph
c, central
Cal, California
cm, centimeter
Co, county, counties
Col, Colorado
Ct, Connecticut
cu, cubic
cult, cultivation, cultivated
DC, District of Columbia
Dec, December
Del, Delaware
distr, distribution
dm, decimeter
e, east, eastern
eastw, eastward
esc, escape, escaped
estab, established
Eu, Europe
Feb, February
fl, flower, flowering
Fla, Florida
fr, fruit, fruiting
frag, fragmentary
ft, foot
Ga, Georgia
Gl, Greenland
I, island
Ia, Iowa
Id, Idaho
Ill, Illinois
in., inch
Ind, Indiana
introd, introduced
Jan, January
Jct, junction
Jul, July
Jun, June
Kan, Kansas
Ky, Kentucky
L, lake
La, Louisiana
Lab, Labrador
lb, pound
LI, Long Island
m, meter
Mack, Mackenzie District
Man, Manitoba
Mar, March
Mass, Massachusetts
Md, Maryland
Me, Maine
Mex, Mexico
Mich, Michigan
Minn, Minnesota
Miss, Mississippi
mm, millimeter
Mo, Missouri
Mont, Montana
Mt(s), Mount, mountains
n, north, northern
NAm, North America(n)
natzd, naturalized
NB, New Brunswick
NC, North Carolina
n.d., no date
ND, North Dakota
NE, New England
ne, northeast, northeastern
Neb, Nebraska
Nev, Nevada
Nf, Newfoundland
NH, New Hampshire
NJ, New Jersey
NM, New Mexico
n.n., no name
northw, northward
Nov, November
n.p., no place
NS, Nova Scotia
nw, Northwest, northwestern

NY, New York
NYC, New York City
NYS, New York State
O, Ohio, Ohio State University
Oct, October
Okla, Oklahoma
Ont, Ontario
Ore, Oregon
Pa, Pennsylvania
Phil, Philadelphia Academy of Sciences
Que, Quebec
R, river
reg, region, regions
RI, Rhode Island
Rt, route
s, south, southern
SAm, South America(n)
Sask, Saskatchewan
SC, South Carolina
SD, South Dakota
sec(s), section(s)
Sep, September
SI, Staten Island
southw, southward
southwestw, southwestward
ssp, subspecies
St, saint
sw, southwest, southwestern
T, transparency; i.e., a 35-mm slide in color
Tenn, Tennessee
Tex, Texas
Trop, tropics, tropical
US, United States
Va, Virginia
var., variety
vic, vicinity
Vt, Vermont
w, west, western
Wash, Washington
westw, westward
WI, West Indies
Wis, Wisconsin
wt, weight
WVa, West Virginia
Wyo, Wyoming
x, a cross between two species, indicating a hybrid
Yuk, Yukon Territory

GLOSSARY OF TECHNICAL TERMS

Unhappily for the amateur, botanical literature is so rife with technical terms that it almost seems necessary to learn a new language in order to be able to read some of it with any degree of comprehension. The writer has tried (but probably not always succeeded very well) not only to keep the use of technical terms to a minimum but also to define those he does use when they first occur. Since glossaries of botanical terms are readily available in most of the field guides, to say nothing of the two more comprehensive ones given in Fernald (1950) and in Gleason (1952), the writer has made no attempt to compile a glossary of botanical terms for this work. In any case, recourse can always be had to *Webster's Seventh New Collegiate Dictionary* (1965), where most of them are defined. Should one wish to go further afield, George Usher's (1966) *A Dictionary of Botany* is an excellent reference.

This work contains many references to the medicinal applications of plants, in the course of which the use of a number of medical terms has been necessary. Such words are perhaps likely to be even more unfamiliar to the layman than are those relating more or less strictly to botany. While the definitions of most of the medical terms are likewise given in the dictionary, the following list, compiled in part from Krochmal *et al*. (1971), may be helpful.

Ague, an old word for fever, usually malaria.
Allergenic, produces an allergy.
Alterative, an old-fashioned medical term meaning a medicine that cures an illness by gradually restoring general bodily health.
Amenorrhea, an abnormal absence or suppression of the menstrual discharge.
Anodyne, relieves or quiets pain.
Antacid, neutralizes excess acidity in the alimentary canal.
Anthelmintic, capable of expelling or destroying intestinal worms.
Antiasthmatic, relaxes bronchial muscles and relieves labored breathing.
Antibiotic, an organic chemical substance, derived from living things, that will work selectively against harmful microorganisms.
Antidote, counteracts the action of a poison.
Antipruritic, prevents or relieves itching (antipsoriatic).
Antipyretic, any medicine for checking or preventing fever; also called "febrifuge" and "refrigerant."
Antiscorbutic, a food or medicine that can prevent or cure scurvy; any plant that contains significant amounts of vitamin C is an antiscorbutic.
Antiseptic, checks or inhibits the growth of the microorganisms that cause infection.
Antitussive, relieves or prevents coughing.
Aperient, a mild and gentle-acting laxative
Aromatic, a plant, drug, or medicine with a spicy scent and pungent but pleasing taste.
Astringent, causes the contraction or shrinkage of body tissues.
Ataxia, an inability to coordinate voluntary muscular movements.
Calculous, a mineral deposit or "stone," usually in the bladder or kidney.
Carcinogenic, causing cancer.
Carminative, used to discourage the formation of gas after eating.

Catarrhal, related to inflammation of the respiratory tract.
Cathartic, causes an evacuation of the bowel.
Caustic, destroys tissue.
Cholagogue, increases the flow of bile
Consumption, an old term for tuberculosis.
Corroborant, an invigorating agent.
Counterirritant, causes irritation of the surface of an area with the object of relieving a deep-seated congestion.
Cystic, relating to the urinary bladder or to the gall bladder.
Cystitis, inflammation of the urinary tract.
Cytotoxic, poisonous to cells.
Decoction, an extract obtained by boiling.
Demulcent, a substance used to protect or soothe the gastro-intestinal tract.
Deobstruent, a medicine that has the power to clear obstructions from the natural ducts of the body.
Depurative, removes impurities and waste materials from the blood.
Diaphoretic, used to increase perspiration.
Disinfectant, destroys or inhibits the growth of harmful microorganisms.
Diuretic, increases the volume and flow of urine.
Drastic, an agent that acts rapidly or violently.
Dropsy, edema, an abnormal accumulation of serous fluid in bodily tissues (excess "water" in the common tongue).
Dysentery, a disease characterized by severe diarrhea with passage of mucus and blood, usually caused by infection.
Dyspepsia, a disturbed digestive condition characterized by nausea, gas, and heartburn; indigestion.
Emetic, an agent that causes vomiting.
Emmenagogue, an agent that induces menstrual flow.
Emollient, used externally to soothe or soften the skin and protect it.
Excoriation, a peeling or wearing off of the skin.
Expectorant, an agent that causes expulsion of phlegm from the respiratory tract.
Febrifuge, an agent that reduces fever.
Flatulence, stomach discomfort caused by gas.
Flux, an excessive abnormal discharge from the bowels.
Gastritis, inflammation of the mucous membrane, particularly of the stomach.
Hemoptysis, expectoration of blood from some part of the respiratory tract.
Hemorrhage, a copious discharge of blood from the blood vessels; bleeding.
Hemostatic, an agent used to stop internal hemorrhage.
Hepatic, of or pertaining to the liver.
Herpetic, pertaining to reptiles.
Hygroscopic, having the ability to attract and absorb moisture from the surrounding environment.
Hypnotic, an agent that induces sleep without delirium.
Infusion, an extract obtained by steeping or soaking in water, usually hot but not boiling.
Irritant, causes inflammation of, or stimulation to, the tissues.
Jaundice, a diseased condition that causes the skin, eyes, and body fluids to turn a yellowish-green color.
Lumbago, painful muscular rheumatism usually involving the lower back.
Menorrhagia, an abnormally profuse menstrual flow.
Nephritis, inflammation of the kidneys.

Nervine, a medicine that will quiet nervousness or act as a tonic to nerve tissue; a relaxant or calmative.

Ophthalmiatric, used in the treatment of eye diseases.

Pectoral, usually an expectorant, used for diseases of the chest and lungs.

Peritonitis, inflammation of the tissues lining the abdominal cavity.

Poultice, a soft, usually heated, medicinal substance spread on cloth and applied to the skin.

Pressor, raising or tending to raise blood pressure.

Pulmonary, pertaining to the lungs.

Purgative, increases peristalsis (contraction of the bowel).

Pustulant, causes severe irritation of the skin, especially the sweat glands.

Refrigerant, allays thirst and gives a sensation of coolness to the body.

Rheumatism, a sort of catch-all term that includes almost any pain and stiffness of the joints.

Rickets, a childhood disease characterized by defective deposition and utilization of calcium and phosphorus owing to inadequate sunlight or vitamin D.

Rubifacient, causes reddening and mild irritation of the skin.

Scorbutic, relating to or resembling scurvy.

Scurvy, a disease marked by swollen and bleeding gums, loosening of teeth, and bleeding into the skin and mucous membranes, resulting from a lack of ascorbic acid (vitamin C).

Sialagogue, causes an increase in flow of saliva.

Somnifacient, produces sleep without delirium; a soporific.

Soporific, tending to induce sleep.

Stimulant, a substance that increases the activity of some part of the body, but not all stimulants bring a feeling of well-being; stumulants must be carefully distinguished from narcotics, which often bring a feeling of euphoria by depressing certain nerve centers.

Stomachic, stimulates appetite and increases secretion of digestive juices.

Styptic, an agent to check or stop bleeding; most herbal styptics are strong astringents that staunch the flow of blood by shrinking the surrounding tissues, thus closing the exposed blood vessels.

Sudorific, increases perspiration.

Thoracic (pertaining to the chest), a medicine used to treat complaints of the lungs and bronchial tubes.

Tincture, a solution of a medicinal substance in alcohol.

Tonic, stimulates the restoration of strength or tone to the muscles; bitter tonics achieve this by stimulating the flow of gastric juices, which increases the appetite, enabling the patient to consume more nourishing food.

Urethritis, infection of the urethra, the duct by which urine is discharged from the bladder.

Vermicide, an agent that destroys worms.

Vermifuge, a substance used to destroy or expel parasitic intestinal worms.

Vesicant, causes irritation to the skin, resulting in blisters.

Vulnerary, an agent that promotes healing of open wounds.

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APPENDIX

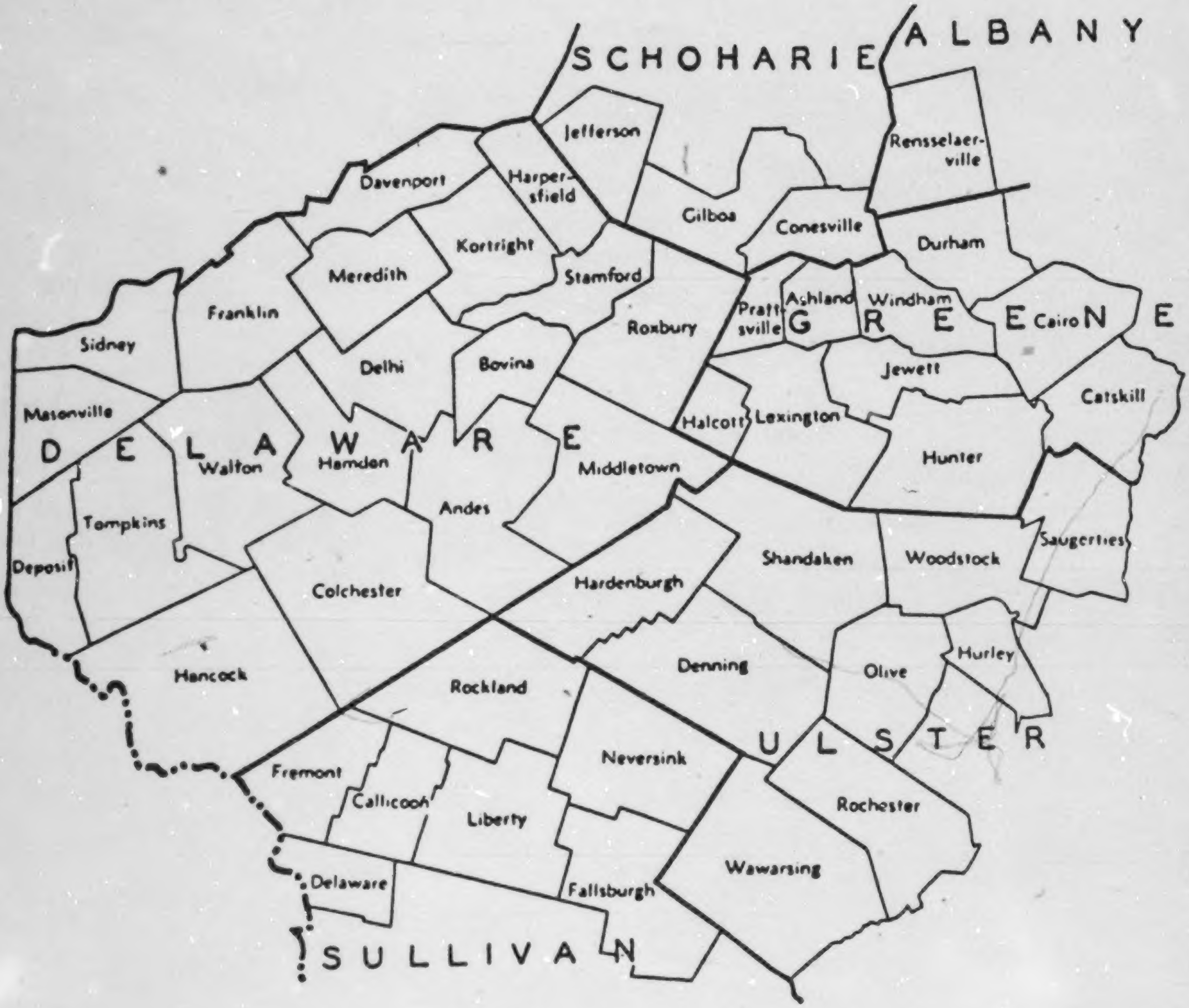
Many scientific studies of plant distribution are made on grid plots of equal size and shape. While not strictly accurate from the scientific point of view, the township boundaries in each county do effectively break up the area into a grid. Following a device used by a number of other writers faced with a similar problem, the township grid has been used as the basis for the distribution maps that follow, the selection of records being based on the following criteria:

1. All specimens collected in the Catskills have been listed, even when two or more came from the same township.
2. All known references in the literature have been included.
3. In the absence of specimens, with few exceptions, only the earliest observation for each township is given, regardless of the number of observations at hand for that area.
4. Records are arranged in chronological sequence by county.
5. In selecting the records for each township, collections take precedence; when no collection records are available, photographs take precedence over observations as representing more objective evidence of the occurrence of the species in that area.
6. Owing to the uncertain status of species on the Platt list, subsequent records for the Town of Franklin in Delaware County are also listed as confirmation of the fact that the species occurs in that township.

On the distribution maps that follow, a solid dot (•) represents a collection made in that township, while an open circle (o) refers to an observation, a reference in the literature, or a photograph taken by the writer, with "T" indicating a transparency in color and "BW" a black-and-white picture. To conserve space, it has been necessary in some instances to show the distribution of two species on one map, where a cross within an oval (⊕) represents a collection record and an asterisk (*) designates an observation made of the second species. No effort has been made to show the approximate location within the township of collections or observations; the solid dots and open circles simply indicate the occurrence of that taxon somewhere within the township.

Specimens of all critical taxa collected by the writer have been checked by Stanley J. Smith ("SJS" in the records that follow), late curator of botany at the New York State Museum in Albany, and specimens have been deposited with that institution.

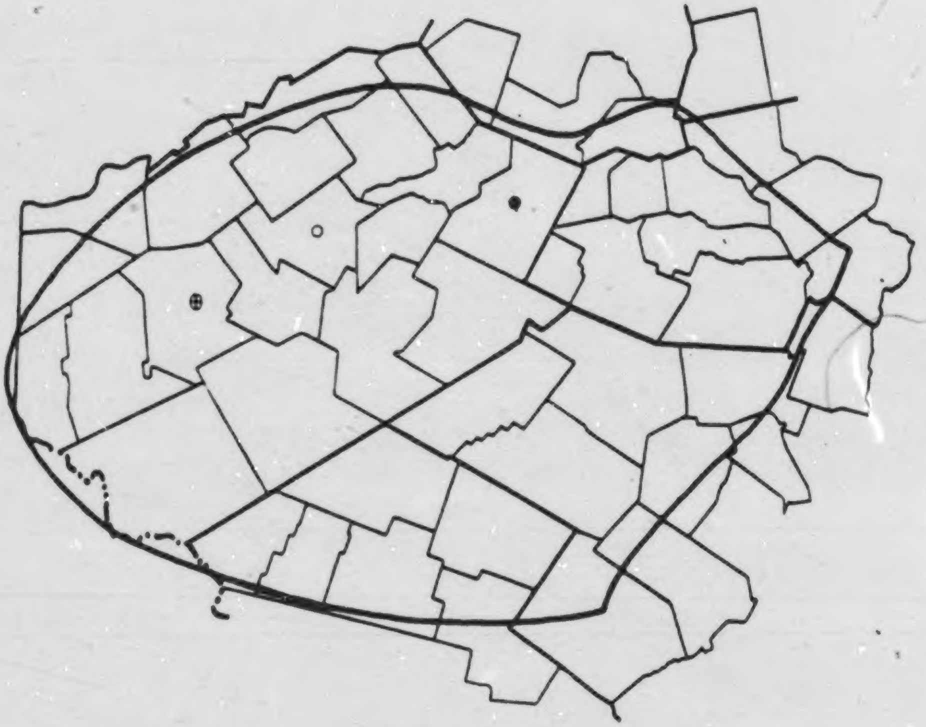
The herbaria where specimens from the Catskill region are filed are indicated in the distribution records as follows: BKL, Brooklyn Botanic Garden; Brooks, herbarium of the writer; CU, Cornell University; MIN, University of Minnesota; NY, New York Botanical Garden; NYS, New York State Museum; O, Ohio State University; PENN, University of Pennsylvania; Phil, Philadelphia Academy of Science; US, U.S. National Herbarium.


SCHOHARIE
ALBANY
Jefferson
Rensselaerville
Davenport
Harpersfield
Gilboa
Conesville
Durham
Kortright
Meredith
Stamford
Franklin
Sidney
Prattsville
Ashland
Windham
G R E E N E
Cairo
Roxbury
Delhi
Bovina
Jewett
Catskill
Masonville
Halcott
Lexington
D E L A W A R E
Walton
Hamden
Middletown
Hunter
Tompkins
Andes
Deposit
Saugerties
Colchester
Shandaken
Woodstock
Hardenburgh
Hancock
Denning
Olive
Hurley
Rockland
U L S T E R
Neversink
Fremont
Callicoon
Liberty
Rochester
Wawarsing
Delaware
Fallsburgh
SULLIVAN

Counties and townships of the Catskill mountain region.

Populus alba L.
White Poplar

Flora of
THE CATSKILLS
New York State



Delaware County

3 mi sw of Grand Gorge, Town of Roxbury
6183 Brooks 10 Sep 75--NYS, Brooks
Vic of Delhi, Town of Delhi
KLB obs 15 Aug 76

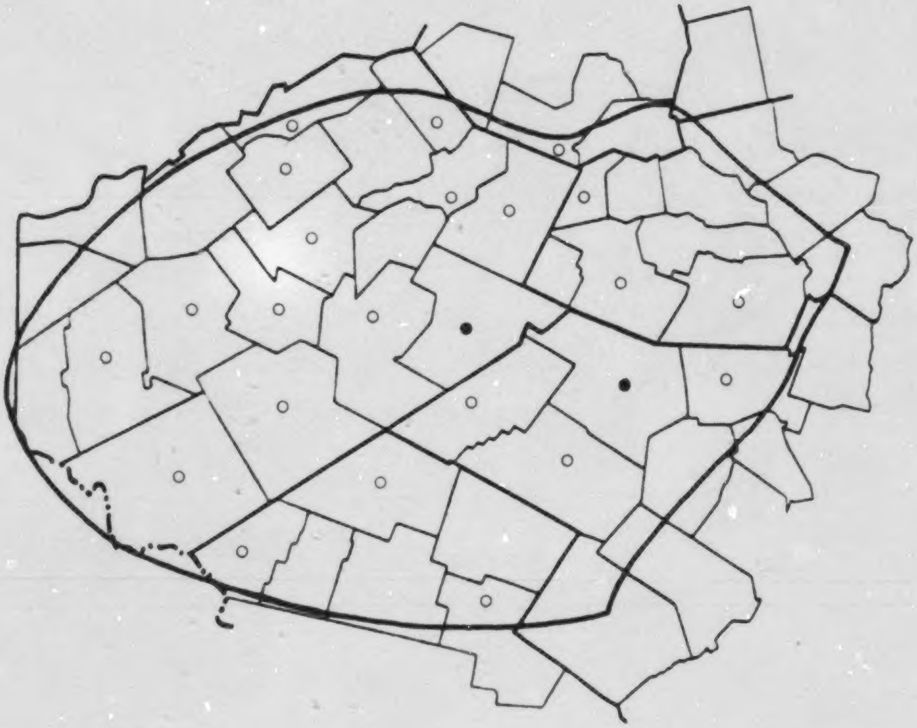
Populus balsamifera L. Balsam Poplar (⊕)

Delaware County

3 mi s of Walton, Town of Walton
6142 Brooks 29 Jun 75--NYS, Brooks

Populus deltoides Marsh.
Eastern Cottonwood

Flora of
THE CATSKILLS
New York State



Delaware County

Bullet Hollow Rd, 5 mi nw of Andes, Town of Delhi
KLB obs 17 Aug 52
Margaretville, Town of Middletown
5143 Brooks 22 Jul 73--NYS, Brooks
Barkaboom Rd, 9 mi s by e of Andes, Town of Andes
KLB obs 23 Jul 73
6 mi e by s of Downsville, Town of Colchester
KLB obs 11 Oct 73
2 mi e by s of Davenport Center, Town of Davenport
KLB obs 24 Jun 74
1 1/2 mi w of Vega, Town of Roxbury
KLB obs 27 Jun 74
Vic of Launt Pond, Town of Walton
KLB obs 28 Jul 74
Bush Clove, 4 mi se of Delancey, Town of Hamden
KLB obs 16 Aug 74

Populus deltoides

2 mi s of E. Meredith, Town of Meredith
KLB obs 1 Aug 75
7 mi e by n of Deposit, Town of Tompkins
KLB obs 10 Aug 75
Vic of Fishs Eddy, Town of Hancock
KLB obs 27 Aug 75
Vic of Harpersfield Center, Town of Harpersfield
KLB obs 4 Sep 76
Vic of Stamford, Town of Stamford
KLB obs 4 Sep 76

Greene County

West Kill brook, 4 mi e of West Kill, Town of Lexington
KLB obs 13 Sep 73
1 1/2 mi n of Devil's Tombstone Campsite, Town of Hunter
KLB obs 10 Sep 74
Vic of Red Falls, Town of Prattsville
KLB obs 14 Sep 75

Schoharie County

Vic of S. Gilboa, Town of Gilboa
KLB obs 22 Sep. 75

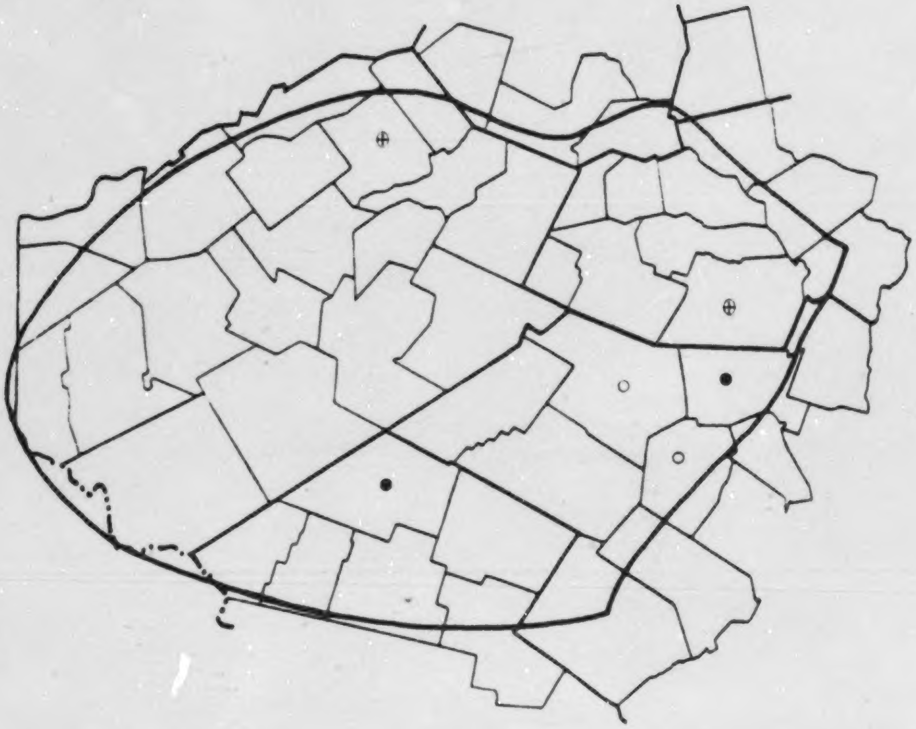
Sullivan County

Vic of Amber L, 3 mi ne of Roscoe, Town of Rockland
KLB obs 4 Aug 74
Vic of Hankins, Town of Fremont
KLB obs 19 Jul 76
Vic of Loch Sheldrake, Town of Fallsburg
KLB obs 2 Aug 76

Ulster County

Phoenicia to Shokan, Town of Shandaken
N. L. Britton 2 Jun 01--NY
Vic of Bull Run, Town of Denning
KLB obs 10 Jun 75
Vic of Dry Brook, Town of Hardenburgh
KLB obs 30 Aug 75
Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
KLB & Claire Friedberg obs 18 Sep 75

Populus x gileadensis Rouleau
Balm-of-Gilead



Sullivan County

1 mi sw of Lew Beach, Town of Rockland
5180 Brooks 3 Jun 74--NYS, Brooks

Populus nigra L. Black Poplar (⊕)

Delaware County

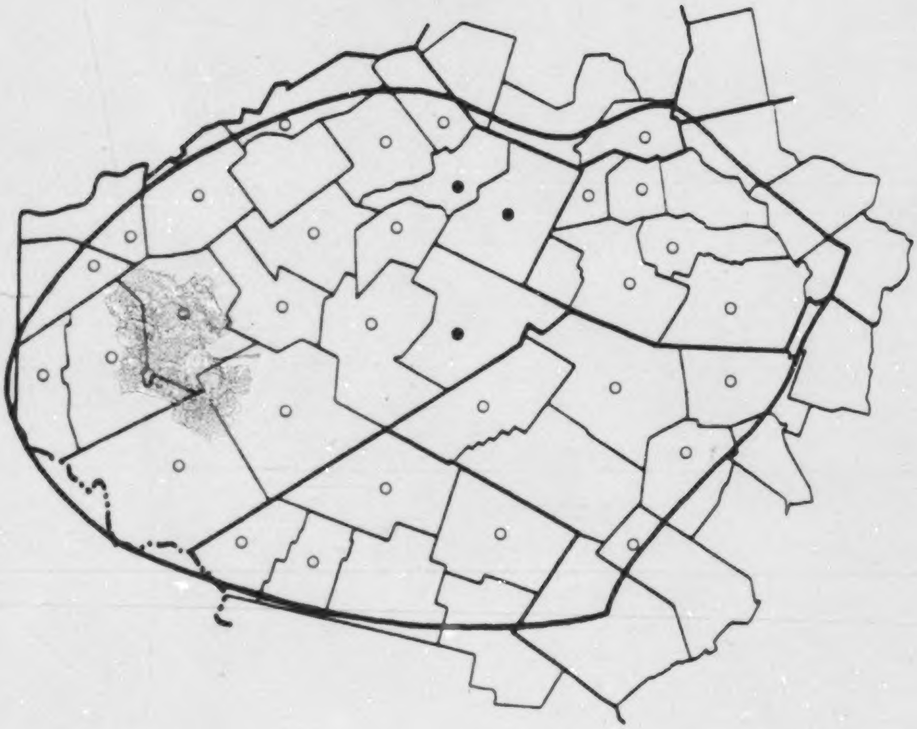
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
2965 Brooks 2 Jul 54--NYS, Brooks

Greene County

Vic of Hunter, Town of Hunter
6140 Brooks 27 Jun 75--NYS

Populus grandidentata Michx.
Large-toothed Aspen

Flora of
THE CATSKILLS
New York State



Delaware County

Stamford, Town of Stamford
   323 N. Taylor 2 Jun 09 at 2000 ft--NY
Arkville, Town of Middletown
   P. Wilson 9 Jul 15--NY
2 mi s of Grand Gorge on Rt 30, Town of Roxbury
   9257 Smith & Brooks 12 May 51--NYS
Cadosia, Town of Hancock
   SJS obs 17 Jun 54
Hoff Farm, 4 1/4 mi nw of Bovina Center, Town of Bovina
   KLB obs 14 Jul 54
Davenport Center, Town of Davenport
   Smith & Brooks obs 7 Aug 54
Margaretville, Town of Middletown
   KLB obs 30 May 55
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
   KLB obs 10 Jul 59

Populus grandidentata

Gregorytown, Town of Colchester
   KLB obs 3 Jul 71
Fraser, Town of Delhi
   KLB obs 20 Aug 72
Big Pond Rd, 14 mi s by e of Andes, Town of Andes
   KLB obs 6 Jun 73
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
   KLB obs 24 Jun 74
Vic of Hawleys, Town of Hamden
   KLB obs 28 Jul 74
1 1/2 mi se of Colchester, Town of Walton
   KLB obs 28 Jul 74
3 mi n of Hobart, Town of Harpersfield
   KLB obs 21 May 75
Vic of Chamberlain Brook, Town of Tompkins
   KLB obs 31 Aug 75
Vic of Silver Lake, Town of Deposit
   KLB obs 31 Aug 75

Greene County

Devil's Tombstone Campsite, Town of Hunter
   KLB obs 5 Jun 74
3 mi e of West Kill, Town of Lexington
   KLB obs 13 Jun 74
2 mi s of Jewett, Town of Jewett
   KLB obs 1 Jul 75
Vic of E. Ashland, Town of Ashland
   KLB obs 4 Jul 75
Prattsville, Town of Prattsville
   KLB obs 4 Jul 75

Schoharie County

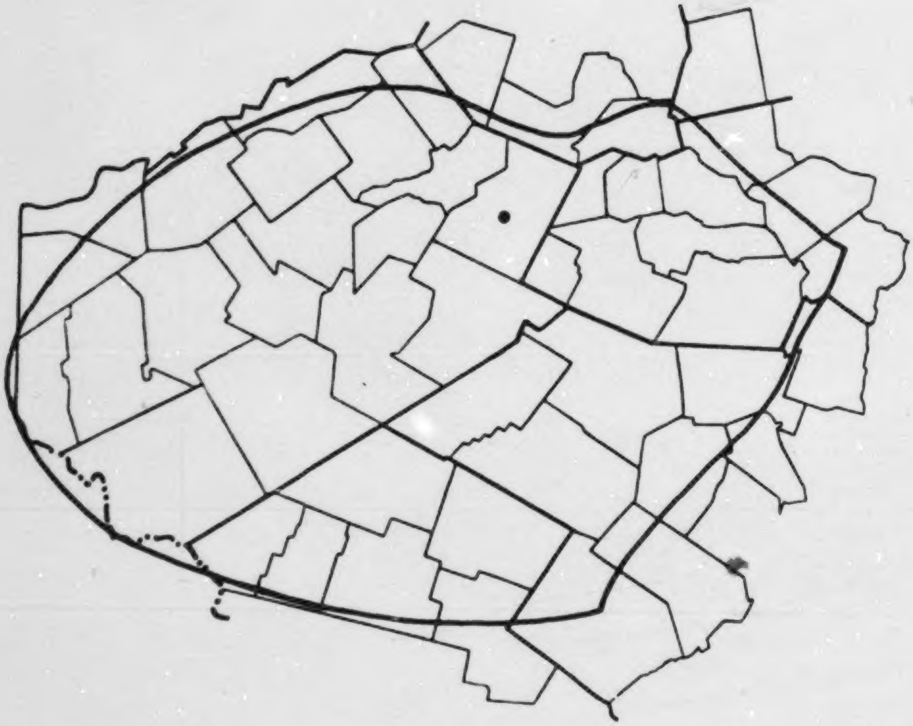
Vic of Manorkill, Town of Conesville
   KLB obs 1 Jul 75

Sullivan County

1 mi sw of Lew Beach, Town of Rockland
   KLB obs 3 Jun 74
Vic of Claryville, Town of Neversink
   KLB obs 11 Jun 74
Vic of Lakewood, Town of Fremont
   KLB obs 21 Jun 75
4 mi n of Callicoon Center, Town of Callicoon
   KLB obs 21 Jun 75

(Continued on p. 252)

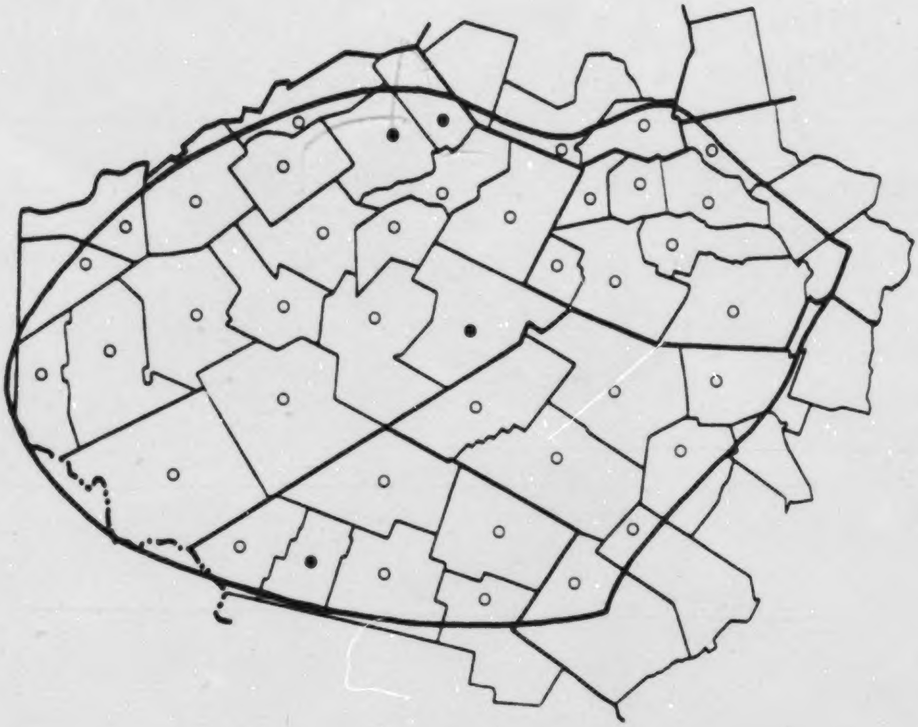
Populus x smithii Boivin
Smith's Hybrid Poplar



Delaware County

Wake Robin, vic of Roxbury, Town of Roxbury
6311 Brooks, Kathy Emerson & Phil Caswell 4 Sep 78--NYS, Brooks

Populus tremuloides Michx.
Trembling Aspen



Delaware County

Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
292 Brooks 24 Jun 51--NYS, Brooks; 300 Brooks 24 Jun 51--NYS (f. reniformis)
Mt Utsayantha, 1 1/2 mi e by s of Stamford, Town of Stamford
KLB obs 3 Jul 54
Gunhouse Hill, 1 1/2 mi sw of Odell Lake, Town of Harpersfield
3797 Brooks 2 Jul 55--NYS
Kilgour Spur, w of Cadosia, Town of Hancock
SJS obs 10-11 Aug 55
Rose Farm, 1 mi s of Margaretville, Town of Middletown
4791 Brooks 1 Jun 68--NYS
2 mi e of Downsville on Rt 30, Town of Colchester
KLB obs 19 Jun 71
Meridale, Town of Meredith
KLB obs 7 Aug 71
Delancey, Town of Hamden
KLB obs 7 Aug 71

Populus tremuloides

Burroughs Rd, 2 1/2 mi w by n of Roxbury, Town of Roxbury
KLB obs 20 Aug 72
Vic of Apex, Town of Tompkins
KLB obs 8 Jul 73
Emmons Pond, Town of Davenport
R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]
2 mi se of Walton, Town of Walton
KLB obs 28 Jul 74
Brace Hollow Rd, 4 mi se of Andes, Town of Andes
KLB obs 10 May 75
Coulter Brook, 2 mi s of Bovina, Town of Bovina
KLB obs 2 Jun 75
3 mi sw of Delhi, Town of Delhi
KLB obs 29 Jun 75
3 mi s of Deposit, Town of Deposit
KLB obs 10 Aug 75
3 mi nw of Trout Creek, Town of Masonville
KLB obs 7 Sep 75
Vic of Sidney Center, Town of Sidney
KLB obs 7 Sep 75
2 mi s of Treadwell, Town of Franklin
KLB obs 21 May 76

Greene County

1 1/2 mi e of Lexington, Town of Lexington
KLB obs 19 Jun 73
2 mi n of Halcott Center, Town of Halcott
KLB obs 25 Jun 73
Vic of Lanesville, Town of Hunter
KLB obs 18 Jul 73
2 mi s of Jewett, Town of Jewett
KLB obs 1 Jul 75
Vic of Prattsville, Town of Prattsville
KLB obs 1 Jul 75
Vic of E. Ashland, Town of Ashland
KLB obs 4 Jul 75
2 mi n of Windham, Town of Windham
KLB obs 21 Jul 75
Vic of Durso Corner, Town of Durham
KLB obs 23 Sep 75

Schoharie County

Vic of Manorkill, Town of Conesville
KLB obs 1 Jul 75
Vic of S. Gilboa, Town of Gilboa
KLB obs 22 Sep 75

Populus tremuloides

Sullivan County

Vic of L Shandelee, Town of Callicoon
P. Wilson 16 Aug 18--NY
1 mi sw of Lew Beach, Town of Rockland
KLB obs 3 Jun 74
Vic of Claryville, Town of Neversink
KLB obs 18 Jun 74
Vic of Lakewood, Town of Fremont
KLB obs 21 Jun 75
Vic of Liberty, Town of Liberty
KLB obs 28 Jul 75
3 mi n of Woodbourne, Town of Fallsburg
KLB obs 2 Aug 76

Ulster County

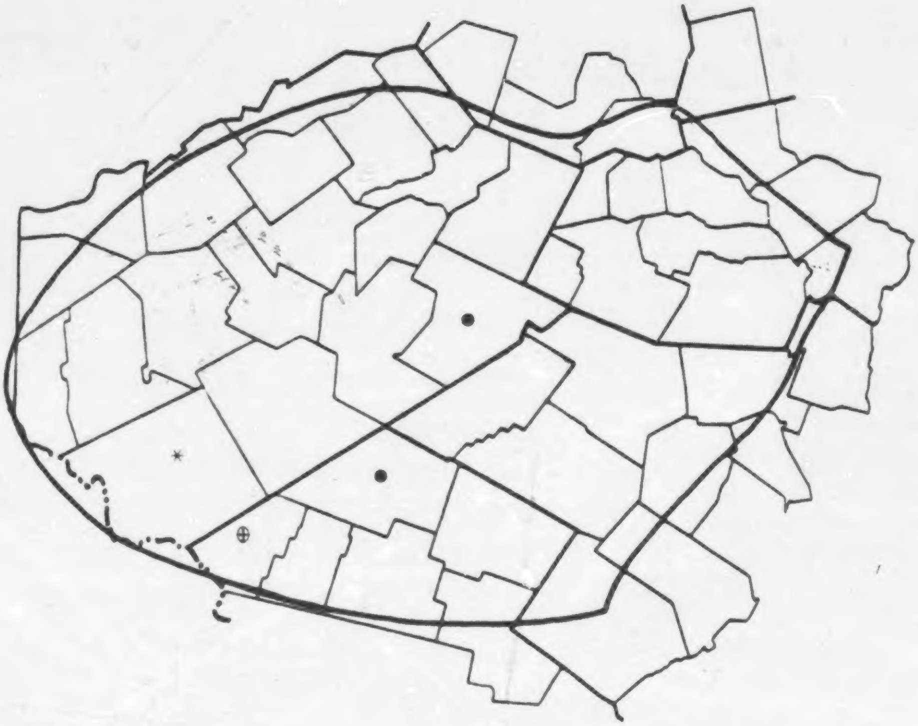
Woodland Valley, 4 mi e of Phoenicia, Town of Shandaken
O. P. Medsger in Mem. Torr. Bot. Club 17: 294-300, 1917.
Overlook Mt, Town of Woodstock
KLB & Mary Domville obs 12 Jul 70
5 1/2 mi se of Margaretville, Town of Hardenburgh
KLB obs 4 Sep 72
Vic of Frost Valley Camp, Town of Denning
KLB obs 11 Jun 74
Vic of Boiceville, Town of Olive
KLB obs 6 Sep 74
3 mi nw of Tabasco, Town of Rochester
KLB & Paul Huth obs 19 Aug 76
2 mi n of Ulster Heights, Town of Warwarsing
KLB & Paul Huth obs 19 Aug 76

Populus grandidentata (continued from p. 248)

Ulster County

Woodland Valley, 4 mi e of Phoenicia, Town of Shandaken
O. P. Medsger in Mem. Torr. Bot. Club 17: 294-300, 1917.
Overlook Mt, Town of Woodstock
KLB & Mary Domville obs 12 Jul 70
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
KLB & Claire Friedberg obs 18 Jul 73
1 mi ne of Dry Brook, Town of Hardenburgh
KLB obs 1 Jun 75
3 mi nw of Tabasco, Town of Rochester
KLB & Paul Huth obs 19 Aug 76

Salix alba L.
   var. vitellina (L.) Stokes
Golden Osier

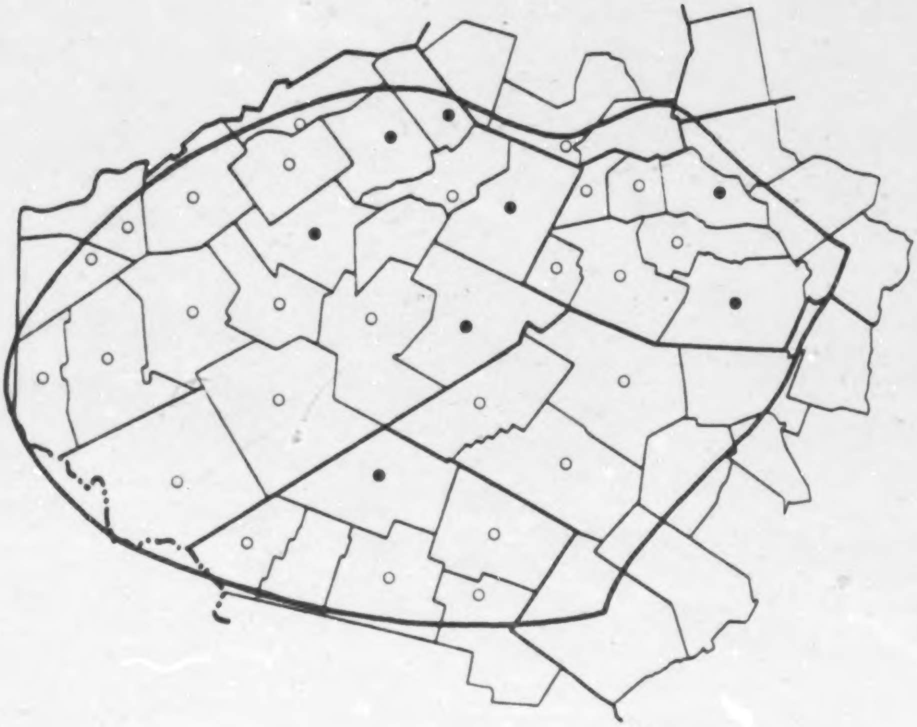


Delaware County
Arkville, Town of Middletown
   394 N. Taylor 3-4 Jun 09 at 1400 ft--NY
Sullivan County
Rockland, Town of Rockland
   6053 Brooks 4 Aug 74--NYS, Brooks

Salix humulis Marsh. Upland Willow (⊕, *)

Delaware County
E. of Kilgour Spur, Town of Hancock
   SJS obs 17 Jun 54
Sullivan County
Vic of Long Eddy, Town of Fremont
   6240 Brooks 19 Jul 76--NYS, Brooks

Salix depressa L.
ssp. rostrata (Anderss.) Hiit.
Long-beaked Willow



Delaware County

2 mi s of Grand Gorge on Rt 30, Town of Roxbury
9259 Smith & Brooks 12 May 51--NYS
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
619 Brooks 23 Jul 51--NYS; 2316 Brooks 17 May 53--NYS, Brooks;
2317 Brooks 17 May 53--NYS
Gerry Estate, 4 mi nw of Andes, Town of Delhi
1474 Brooks 31 May 52--NYS
Gunhouse Hill, 1 mi s of W. Harpersfield, Town of Harpersfield
3812 Brooks 2 Jul 55--NYS
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
4776 Brooks 4 May 68--NYS, Brooks
Big Pond Rd, 14 mi s by e of Andes, Town of Andes
KLB obs 6 Jun 73
6 mi e by n of Downsville, Town of Colchester
KLB obs 16 Jul 73
Roses Brook Rd, 3 mi se of S. Kortright, Town of Stamford
KLB obs 16 May 74

Salix depressa ssp. rostrata

2 mi e by s of Davenport Center, Town of Davenport
   KLB obs 24 Jun 74
Vic of Launt Pond, Town of Walton
   KLB obs 28 Jul 74
Bush Clove, 4 mi se of Delancey, Town of Hamden
   KLB obs 16 Aug 74
Vic of Silver L, Town of Deposit
   KLB obs 31 Aug 75
3 mi nw of Trout Creek, Town of Masonville
   KLB obs 7 Sep 75
Vic of Sidney Center, Town of Sidney
   KLB obs 7 Sep 75
Storey Place, 6 mi se of Franklin, Town of Franklin
   KLB obs 20 Jun 76
Vic of Pea Brook, Town of Hancock
   KLB obs 19 Jul 76

Greene County

Tannersville, Town of Hunter
   Anna M. Vail 13 Jun 01--NY
Windham, Town of Windham
   1136 N. Taylor 6 Aug 09 at 1700 ft--NY
West Kill brook, 4 mi e of West Kill, Town of Lexington
   KLB obs 13 Sep 73
3 mi n of Halcott Center, Town of Halcott
   KLB obs 31 May 75
Vic of Beaches Corners, Town of Jewett
   KLB obs 4 Jul 75
2 mi n by e of Ashland, Town of Ashland
   KLB obs 4 Jul 75
Vic of Prattsville, Town of Prattsville
   KLB obs 17 Aug 76

Schoharie County

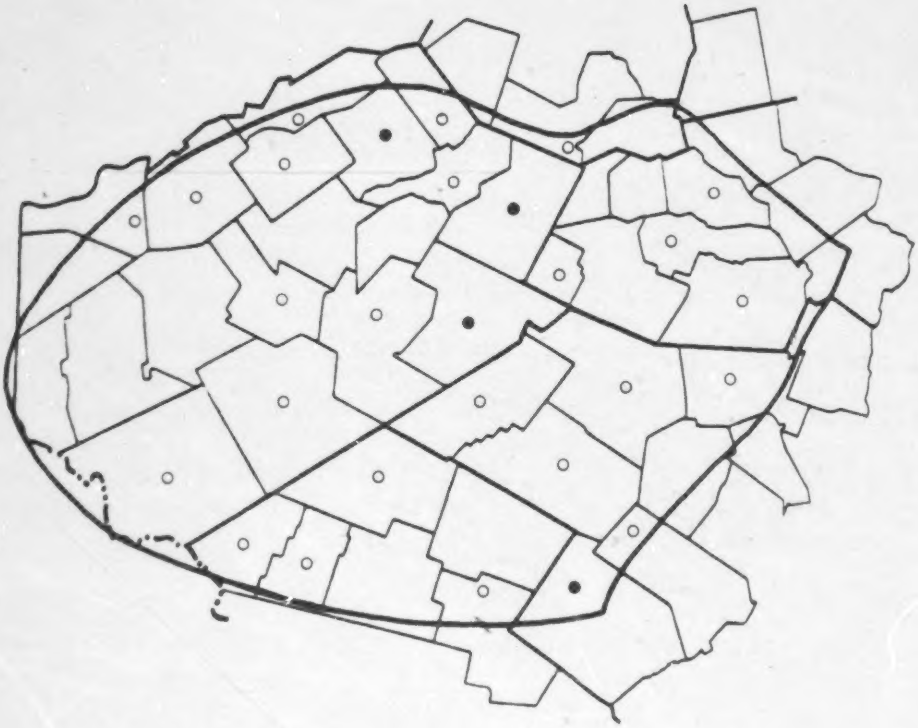
Vic of S. Gilboa, Town of Gilboa
   KLB obs 22 Sep 75

Sullivan County

1 mi sw of Lew Beach, Town of Rockland
   5182 & 5185 Brooks 3 Jun 74--NYS
Vic of Claryville, Town of Neversink
   KLB obs 11 Jun 74
Vic of Parksville, Town of Liberty
   KLB obs 28 Jul 75
Vic of Tennanah L, Town of Fremont
   KLB obs 19 Jul 76

(Continued on p. 270)

Salix discolor Muhl.
Pussy Willow



Delaware County

2 mi s of Grand Gorge on Rt 30, Town of Roxbury
9258 Smith & Brooks 12 May 51--NYS
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
621 Brooks 23 Jul 51--Brooks; 2318A Brooks 17 May 53--Brooks
Dunraven, Town of Middletown
4775 Brooks 4 May 68--NYS, Brooks
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
4781 Brooks 5 May 68--NYS
Weaver Hollow, 5 mi e of Andes, Town of Andes
KLB obs 23 Jun 73 (specimen checked)
2 mi e by s of Davenport Center, Town of Davenport
KLB obs 24 Jun 74
Pepacton, 5 mi e of Downsville, Town of Colchester
KLB obs 4 Aug 74
Bush Clove, 4 mi se of Delancey, Town of Hamden
KLB obs 16 Aug 74

Salix discolor

Vic of Sidney Center, Town of Sidney
  KLB obs 7 Sep 75
Storey Place, 6 mi se of Franklin, Town of Franklin
  KLB obs 20 Jun 76
3 mi n of Hobart, Town of Harpersfield
  KLB obs 27 Jun 76

Greene County

2 mi e of Maplecrest, Town of Windham
  SJS obs 11 Oct 52
Stony Clove, Town of Hunter
  Smith & Herrick obs 3 Jun 73
3 mi e of Jewett Center, Town of Jewett
  KLB obs 10 Sep 74
Steinfeld Place, 3 mi n of Halcott Center, Town of Halcott
  KLB obs 13 Sep 75

Schoharie County

Vic of S. Gilboa, Town of Gilboa
  KLB obs 22 Sep 75

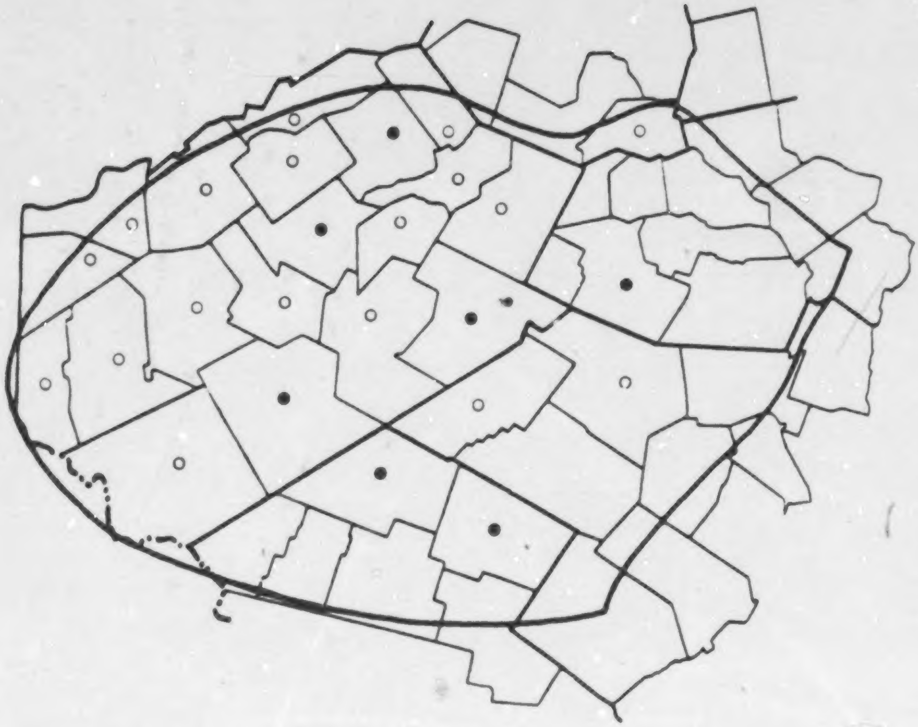
Sullivan County

Roscoe, Town of Rockland
  KLB obs 4 Aug 74
3 mi s by w of Livingston Manor, Town of Callicoon
  KLB obs 15 Jun 76
Vic of Tennanah L, Town of Fremont
  KLB obs 19 Jul 76
3 mi n of Woodbourne, Town of Fallsburg
  KLB obs 2 Aug 76

Ulster County

Rondout, Town of Warwarsing
  1841 N. Taylor 1 May 10--NY
Vic of Oliverea, Town of Shandaken
  KLB obs 26 Jun 73
Vic of Hardenburgh, Town of Hardenburgh
  KLB obs 14 May 74
Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
  KLB & Claire Friedberg obs 18 Sep 75
Vic of Frost Valley Camp, Town of Denning
  KLB obs 2 Aug 76
3 mi nw of Tobasco, Town of Rochester
  KLB & Paul Huth obs 19 Aug 76

Salix fragilis L.
Crack Willow



Delaware County

Cameron Farm, 6 mi nw of Andes, Town of Delhi
387 Brooks 27 Jun 51--NYS, Brooks
Old Oblinsky Farm, 1 1/2 mi se of Kortright Center, Town of Kortright
3000 Brooks 5 Jul 54--NYS, Brooks
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
KLB obs 10 Jul 59
Rose Farm, 1 mi s of Margaretville, Town of Middletown
4783 Brooks 5 May 68--NYS, Brooks
Delancey, Town of Hamden
KLB obs 7 Aug 71
Rt 18, 1 1/2 mi ne of S. Kortright, Town of Stamford
KLB obs 20 Aug 72
1 mi sw of Bovina Center, Town of Bovina
KLB obs 27 May 73
Weaver Hollow, 5 mi e of Andes, Town of Andes
KLB obs 23 Jun 73 (specimen checked)

Salix fragilis

Vic of Meridale, Town of Meredith
KLB obs 7 Jul 73
Vic of Harvard, Town of Hancock
KLB obs 8 Jul 73
Vic of Stratton Falls, Town of Roxbury
KLB obs 8 Jul 74
Vic of Downsville, Town of Colchester
6091 Brooks 24 May 75--NYS
Walton, Town of Walton
KLB obs 10 Aug 75
Vic of Silver L, Town of Deposit
KLB obs 31 Aug 75
Vic of Sidney Center, Town of Sidney
KLB obs 7 Sep 75
3 mi nw of Trout Creek, Town of Masonville
KLB obs 7 Sep 75
Vic of Harpersfield, Town of Harpersfield
KLB obs 30 Sep 75
1 mi s of Davenport Center, Town of Davenport
KLB obs 30 Sep 75

Greene County

3 mi e of West Kill, Town of Lexington
6095 Brooks 27 May 75--NYS

Schoharie County

Vic of Conesville, Town of Conesville
KLB obs 17 Aug 76

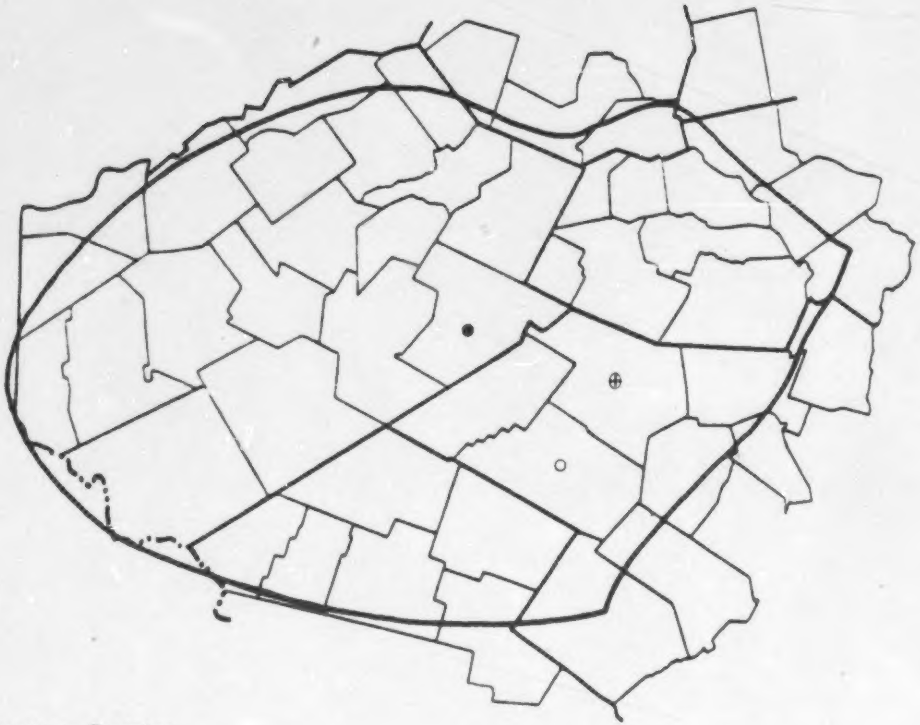
Sullivan County

1 mi sw of Lew Beach, Town of Rockland
5181 Brooks 3 Jun 74--NYS
2 1/2 mi s of Claryville, Town of Neversink
6112 Brooks 10 Jun 75

Ulster County

Vic of Shandaken, Town of Shandaken
KLB obs 13 Jun 74
Vic of Dry Brook, Town of Hardenburgh
KLB obs 22 May 76

Salix x myricoides (Muhl.) Carey
Myrtle-leaved Willow



Delaware County

Walling Place, 1 mi n of Fleischmanns, Town of Middletown
4957 Brooks 30 May 70--NYS, Brooks

Ulster County

5 mi s of Frost Valley Camp, Town of Denning
KLB obs 10 Jun 75.(specimen checked)

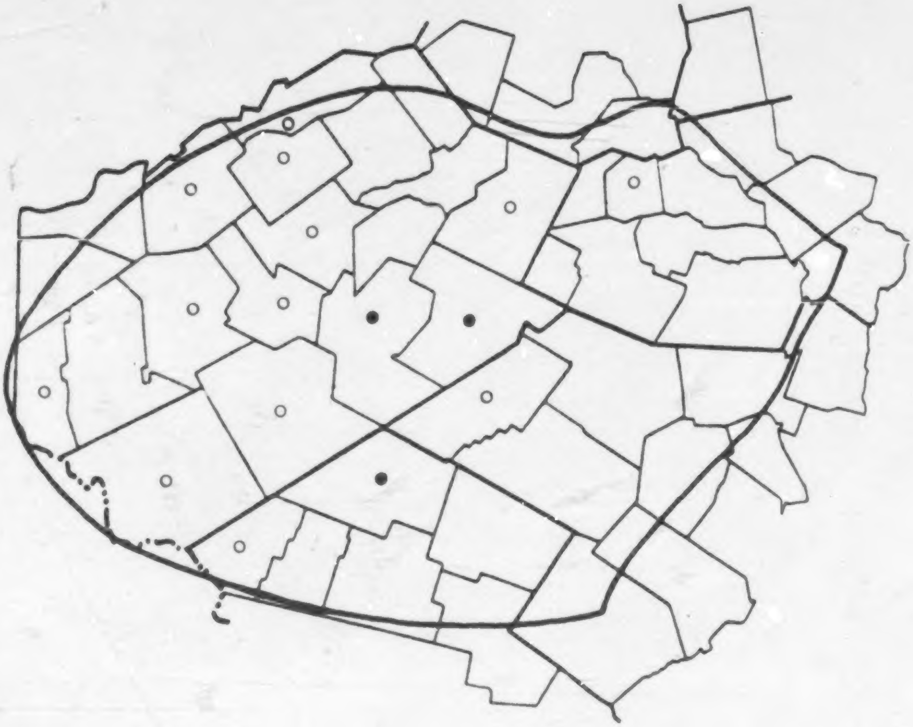
Salix pentandra L. Bay-leaved Willow (⊕)

Ulster County

Big Indian, Town of Shandaken
5190 Brooks 5 Jun 74--NYS, Brooks

Salix nigra Marsh.
Black Willow

Flora of
THE CATSKILLS
New York State

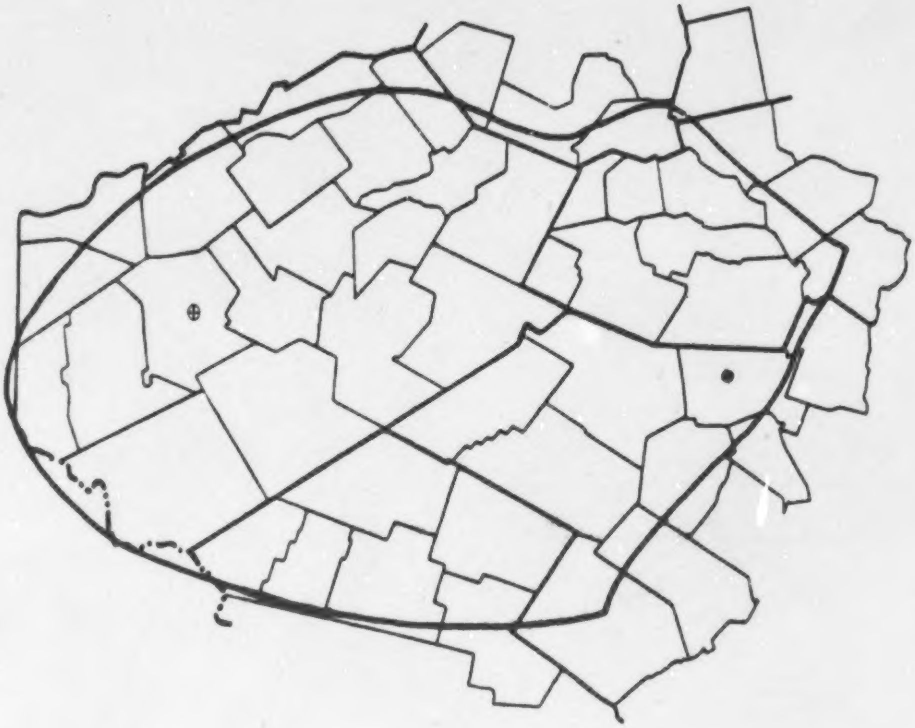


Delaware County

Franklin, Town of Franklin
M. Platt, 1840
Kilgour Spur, w of Cadosia, Town of Hancock
SJS obs 10-11 May 55
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
5064 Brooks 17 Jul 71--NYS
Emmons Pond, Town of Davenport
R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]
Mud Lake, 12 mi s of Andes, Town of Andes
6043 Brooks 31 Jul 74--NYS
1 1/2 mi s of Stratton Falls, Town of Roxbury
KLB obs 29 May 75
3 mi sw of Delhi, Town of Delhi
KLB obs 29 Jun 75 (specimen checked)
3 mi e by s of Walton, Town of Walton
KLB obs 29 Jun 75 (specimen checked)

(Continued on p. 267)

Salix petiolaris J. E. Smith
Slender Willow



Ulster County

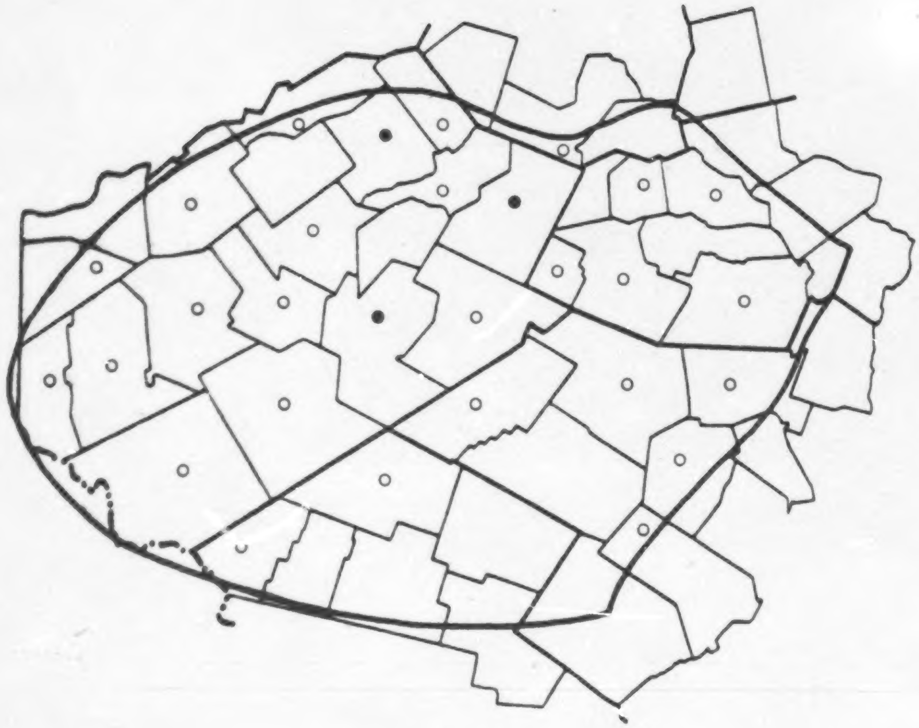
Between Shady and Lake Hill, Town of Woodstock
1261 H. Dunbar 18 Jun 60--NYS

Salix purpurea L. Basket Willow (⊕)

Delaware County

Vic of Launt Pond, Town of Walton
6041 Brooks 28 Jul 74--NYS, Brooks

Salix rigida Muhl.
Heart-leaved Willow



Delaware County

2 mi s of Grand Gorge on Rt 30, Town of Roxbury
9260 Smith & Brooks 12 May 51--NYS
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
1784 Brooks & Smith 19 Jul 52--NYS; 2382 Brooks 5 Jul 53--Brooks
Mt Utsayantha, 1 1/2 mi e by s of Stamford, Town of Stamford
KLB obs 3 Jul 54
1 mi s of W. Harpersfield, Town of Harpersfield
KLB obs 2 Jul 55
Sw of Dunraven, Town of Middletwon
SJS obs 10-11 Aug 55
Kilgour Spur, Town of Hancock
SJS obs 10-11 Aug 55
2 mi e of Downsville on Rt 30, Town of Colchester
KLB obs 19 Jun 71
2 mi e by s of Davenport Center, Town of Davenport
KLB obs 24 Jun 73

Salix rigida

Barkaboom Rd, 1 mi se of Tompkins Falls, Town of Andes
5163 Brooks 12 May 74--NYS
Vic of Hawleys, Town of Hamden
KLB obs 28 Jul 74
Vic of Launt Pond, Town of Walton
KLB obs 28 Jul 74
Elk Creek, 3 mi ne of Delhi, Town of Delhi
KLB obs 18 Aug 74
Vic of Silver Lake, Town of Deposit
KLB obs 31 Aug 75
Mormon Hollow Rd, 3 mi w of Trout Creek, Town of Masonville
KLB obs 7 Sep 75

Greene County

2 mi e of Maplecrest, Town of Windham
SJS obs 11 Oct 52
1 1/2 mi e of Lexington, Town of Lexington
KLB obs 19 Jun 73
Vic of Lanesville, Town of Hunter
KLB obs 18 Jul 73
Elk Creek Rd, 2 mi ne of Halcott Center, Town of Halcott
KLB obs 19 May 74 (specimen checked)
Vic of E. Ashland, Town of Ashland
KLB obs 4 Jul 75

Schoharie County

Vic of S. Gilboa, Town of Gilboa
KLB obs 22 Sep 75

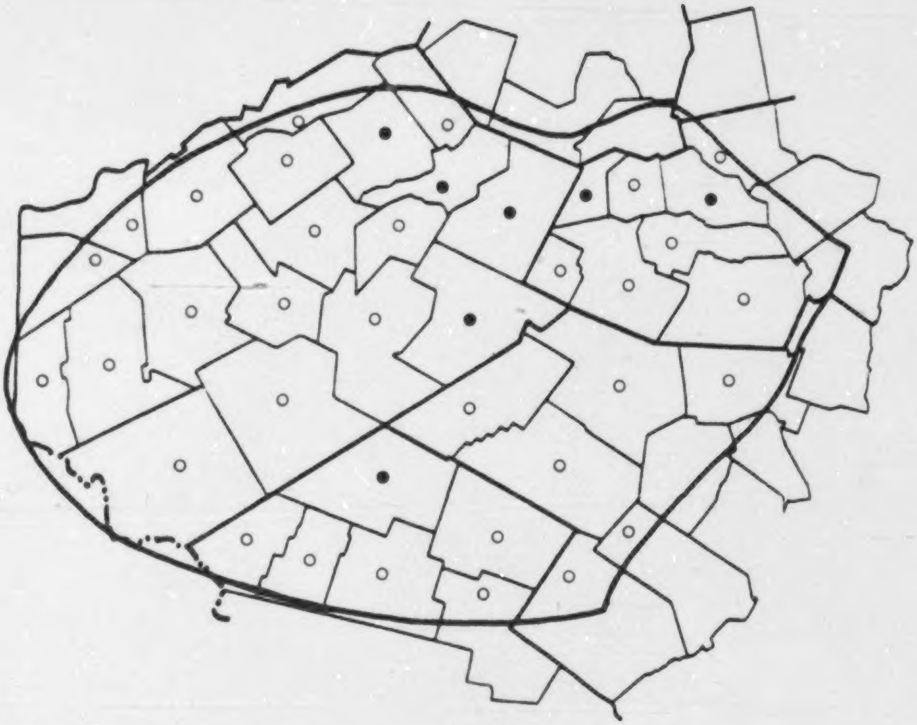
Sullivan County

Beaverkill Campsite, Town of Rockland
KLB obs 3 Jun 74

Ulster County

Huth Place, 1 mi s of Pine Hill, Town of Shandaken
Brooks & Paul Huth obs 24 Jun 73
Dry Brook, Town of Hardenburgh
KLB obs 28 May 74
Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
KLB & Claire Friedberg obs 18 Sep 75
3 mi nw of Tabasco, Town of Rochester
KLB & Paul Huth obs 19 Aug 76

Salix sericea Marsh.
Silky Willow



Delaware County

Stamford, Town of Stamford
380 N. Taylor 3 Jun 09 at 1800 ft--NY
Arkville, Town of Middletown
422 N. Taylor 3-4 Jun 09 at 1400 ft--NY: P. Wilson 26 Jul 15--NYS
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
75 Brooks 5 May 51--NYS; 620 Brooks 23 Jul 51--NYS: 2318 Brooks 17 May 53--NYS, Brooks
2 mi s of Grand Gorge on Rt 30, Town of Roxbury
9261 Smith & Brooks 12 May 51--NYS
Cleveland Farm, 1 1/2 mi s by w of W. Harpersfield, Town of Kortright
1674 Brooks 11 Jul 52--NYS
Cameron Farm, 6 mi nw of Andes, Town of Delhi
KLB obs 13-16 Jul 54
Hoff Farm, 2 1/2 mi nw of Bovina Center, Town of Bovina
KLB obs 14 Jul 54
1 mi s of W. Harpersfield, Town of Harpersfield
KLB obs 2 Jul 55

Salix sericea

1 1/2 mi s of Andes, Town of Andes
  KLB obs 14 Jul 73 (specimen checked)
6 mi e by n of Downsville, Town of Colchester
  KLB obs 16 Jul 73
Vic of Launt Pond, Town of Walton
  KLB obs 28 Jul 74
Vic of Silver L, Town of Deposit
  KLB obs 31 Aug 75
1 1/2 mi w of Loomis, Town of Tompkins
  KLB obs 7 Sep 75
Mormon Hollow Rd, 3 mi w of Trout Creek, Town of Masonville
  KLB obs 7 Sep 75
1/2 mi s of Davenport, Town of Davenport
  KLB obs 30 Sep 75
E. Meredith, Town of Meredith
  KLB obs 4 Jun 76
Storey Place, 6 mi se of Franklin, Town of Franklin
  KLB obs 20 Jun 76
Vic of Pea Brook, Town of Hancock
  KLB obs 19 Jul 76

Greene County

Windham, Town of Windham
  917 N. Taylor 28-31 Jul 09 at 1700 ft--NY
Batavia Kill near Prattsberg [Prattsville], Town of Prattsville
  T. C. Bain 11 May 41--NYS
West Kill brook, 4 mi e of West Kill, Town of Lexington
  KLB obs 13 Sep 73
Devil's Tombstone Campsite, Town of Hunter
  KLB obs 4 Jul 74
3 mi n of Halcott Center, Town of Halcott
  KLB obs 31 May 75
Vic of Beaches Corners, Town of Jewett
  KLB obs 4 Jul 75
Vic of E. Ashland, Town of Ashland
  KLB obs 4 Jul 75
Vic of Durso Corner, Town of Durham
  KLB obs 26 Sep 75

Sullivan County

Beaverkill Campsite, Town of Rockland
  5174 Brooks 3 Jun 74--NYS
Vic of Claryville, Town of Neversink
  KLB obs 11 Jun 74
Vic of Parksville, Town of Liberty
  KLB obs 28 Jul 75
3 mi s by w of Livingston Manor, Town of Callicoon
  KLB obs 15 Jun 76

Salix sericea

3 mi n of Woodbourne, Town of Fallsburg
KLB obs 2 Aug 76

Ulster County

Vic of Big Indian, Town of Shandaken
KLB obs 5 Jun 74
Vic of Frost Valley Camp, Town of Denning
KLB obs 11 Jun 74
Vic of Belle Ayre village, Town of Hardenburgh
KLB obs 8 Jul 75
Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
KLB & Claire Friedberg obs 18 Sep 75
3 mi nw of Tabasco, Town of Rochester
KLB & Paul Huth obs 19 Aug 76
2 mi n of Ulster Heights, Town of Warwarsing
KLB & Paul Huth obs 19 Aug 76

Salix nigra (continued from p. 261)

Hamden, Town of Hamden
KLB obs 29 Jun 75 (specimen checked)
E. Meredith, Town of Meredith
KLB obs 1 Aug 75
Vic of Stilesville, Town of Deposit
KLB obs 10 Aug 75

Greene County

Vic of E. Ashland, Town of Ashland
KLB obs 14 Sep 75

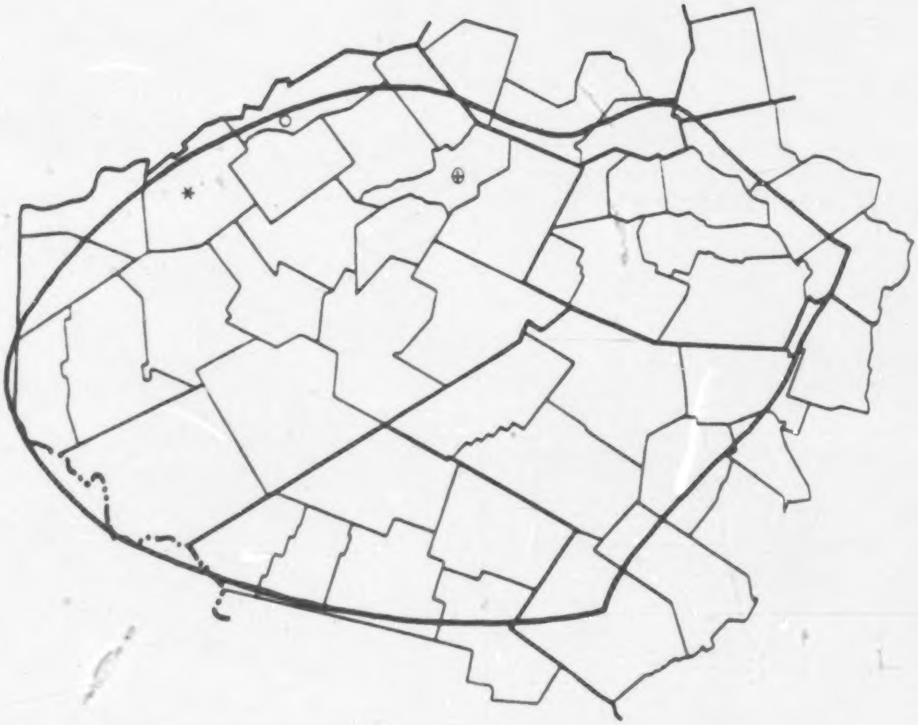
Sullivan County

Vic of Roscoe, Town of Rockland
6054 Brooks 4 Aug 74--NYS

Ulster County

1 mi ne of Dry Brook, Town of Hardenburgh
KLB obs 8 Jul 75

Salix serissima (Bailey) Fern.
Autumn Willow



Delaware County

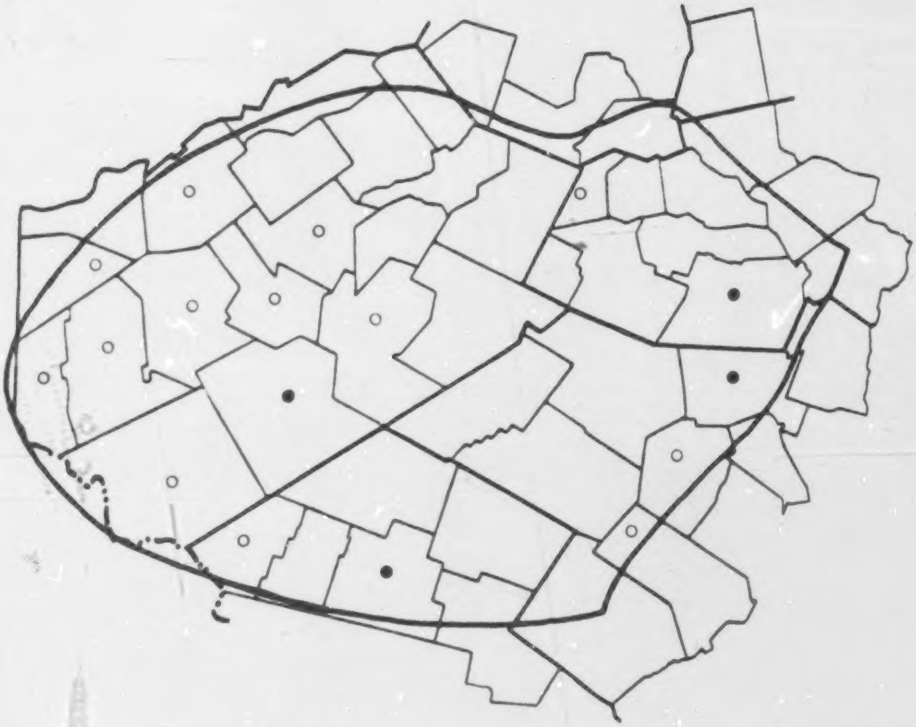
Emmons Pond, Town of Davenport
R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]

Salix tristis Ait. Dwarf Gray Willow (⊕, *)

Delaware County

Franklin, Town of Franklin
M. Platt, 1840
Stamford, Town of Stamford
372 N. Taylor 3 Jun 09 at 1800 ft--NY

Comptonia peregrina (L.) Coult.
Sweet-fern



Delaware County

Franklin, Town of Franklin
M. Platt, 1840
E of Kilgour Spur, Town of Hancock
SJS obs 17-18 Jun 54
3 mi e of Downsville on Rte 30, Town of Colchester
4725 Brooks 21 Aug 66--NYS, Brooks
Delancey, Town of Hamden
KLB obs 7 Aug 71
8 mi s by e of Andes, Town of Andes
KLB obs 21 Jun 75
3 mi sw of Delhi, Town of Delhi
KLB obs 29 Jun 75
3 mi s of Deposit, Town of Deposit
KLB obs 10 Aug 75
7 mi e by n of Deposit, Town of Tompkins
KLB obs 10 Aug 75

Comptonia peregrina

4 mi sw of Walton, Town of Walton
KLB obs 6 Jul 76
3 mi se of Masonville, Town of Masonville
KLB obs 6 Jul 76

Greene County

Kooterskill [Kaaterskill] Mt, Town of Hunter
Anna M. Vail 23 Jul 1891--NY
Prattsville, Town of Prattsville
KLB obs 4 Jul 75

Sullivan County

Toronto L, w of Liberty, Town of Liberty
4633 E. Whitney 30 Jul 35--NYS
Long Eddy, Town of Fremont
SJS obs 18 Jun 54

Ulster County

Overlook Mt, Town of Woodstock
4657 H. K. Svenson 26 Aug 31--BKL
1 mi w of Boiceville, Town of Olive
KLB & Claire Friedberg obs 2 Jul 76
3 mi nw of Tabasco, Town of Rochester
KLB & Paul Huth obs 19 Aug 76

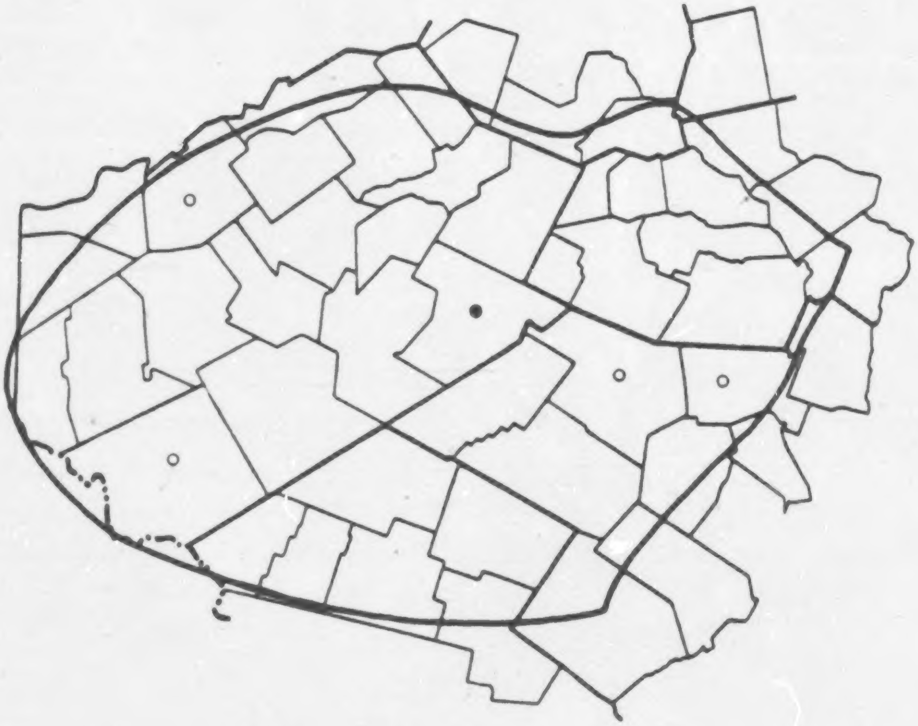
Salix depressa rostrata (continued from p. 255)

3 mi n of Woodbourne, Town of Fallsburg
KLB obs 2 Aug 76

Ulster County

Huth Place, 1 mi s of Pine Hill, Town of Shandaken
KLB & Paul Huth obs 24 Jun 73
Vic of Hardenburgh, Town of Hardenburgh
KLB obs 14 May 74
5 mi s of Frost Valley Camp, Town of Denning
KLB obs 10 Jun 75

Carya cordiformis (Wang.) K. Koch
Bitternut Hickory



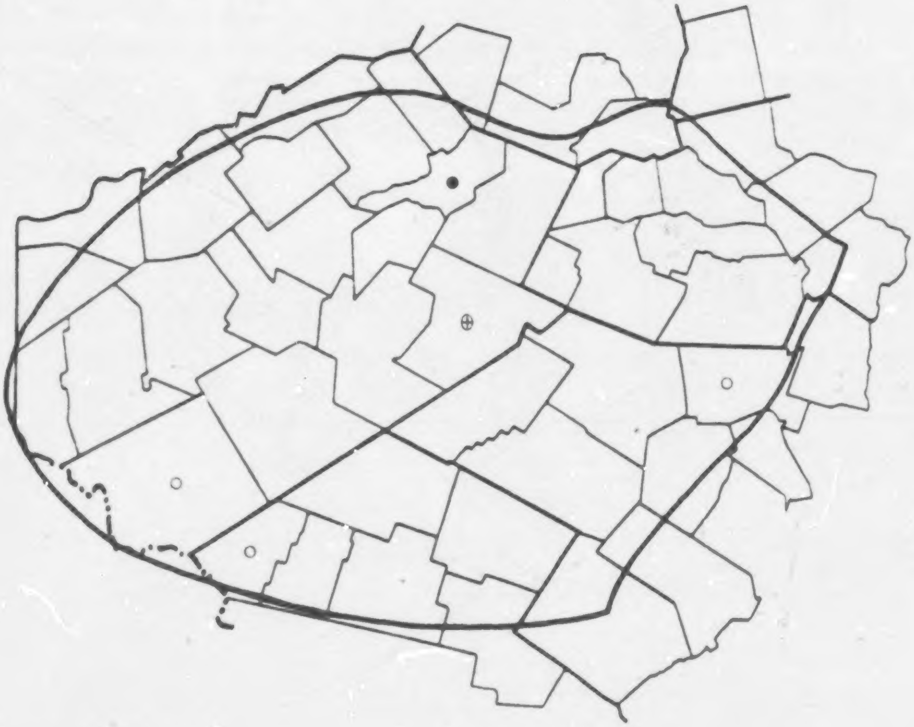
Delaware County

Franklin, Town of Franklin
M. Platt, 1840
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
4751 Brooks 9 Jul 67--NYS, Brooks
Vic of French Woods, Town of Hancock
KLB obs 8 Jul 73
Storey Farm, 3 mi s of Margaretville, Town of Middletown
6175 Brooks 15 Aug 75--NYS

Ulster County

1 1/2 mi se of Pine Hill, Town of Shandaken
KLB obs 21 Jul 74
Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
KLB & Claire Friedberg obs 18 Sep 75

Carya glabra (Mill.) Sweet
Pignut Hickory



Delaware County
Stamford, Town of Stamford
811 N. Taylor 3-10 Jul 09 at 1800 ft--NY
E of Kilgour Spur, Town of Hancock
SJS obs 17-18 Jun 54

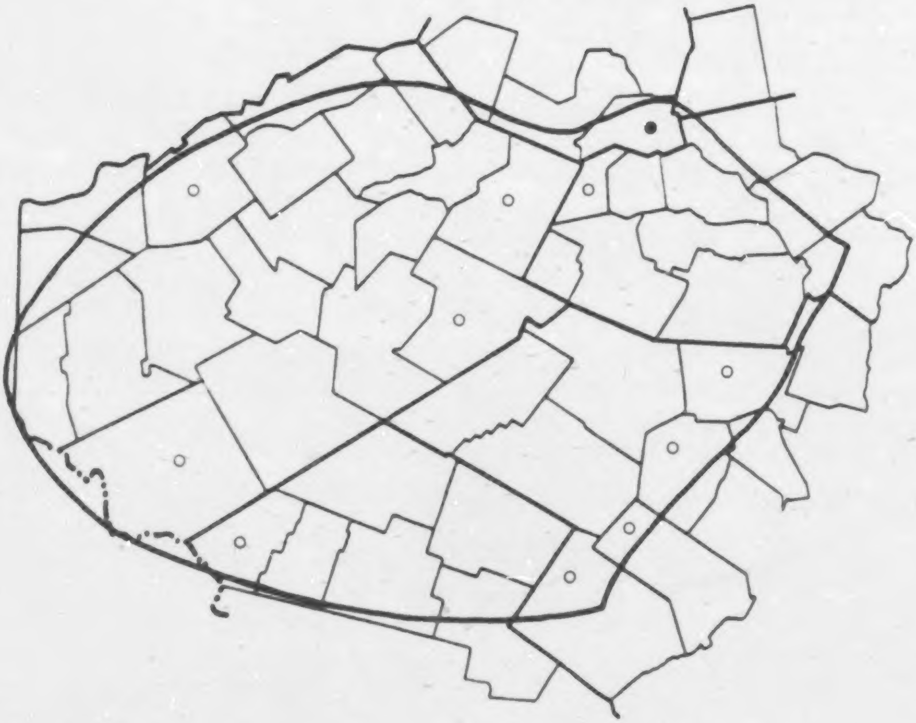
Ulster County
Overlook Mt, Town of Woodstock
KLB & Mary Domville obs 12 Jul 70

Carya x laneyi Sarg. Laney's Hickory (⊕)

Delaware County
Platte Kill, 1 1/2 mi n of Dunraven, Town of Middletown
3726 Brooks 18 Jun 55--NYS, Brooks

Carya ovata (Mill.) K. Koch
Shagbark Hickory

Flora of
THE CATSKILLS
New York State



Delaware County

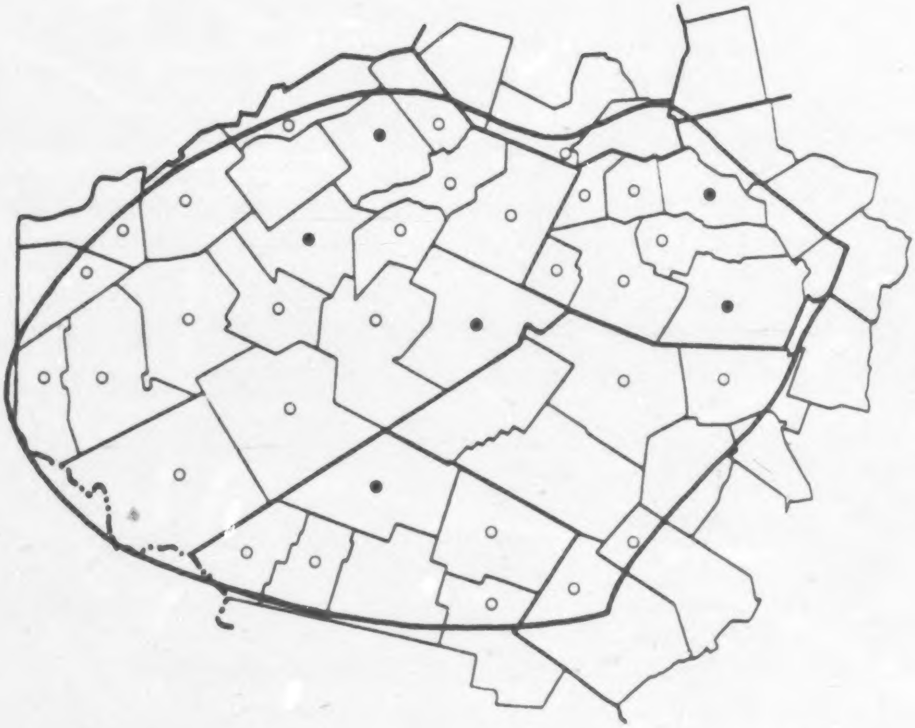
Franklin, Town of Franklin
M. Platt, 1840
Kilgour Spur, w of Cadosia, Town of Hancock
SJS obs 10 Aug 55
Storey Farm, 3 1/2 mi s of Margaretville, Town of Middletown
KLB obs 22 Aug 71
3 mi se of Grand Gorge, Town of Roxbury
6149 Brooks 4 Jul 75--NYS

Greene County

Vic of Prattsville, Town of Prattsville
KLB obs 17 Aug 76

(Continued on p. 276)

Juglans cinerea L.
Butternut



Delaware County

Bullet Hollow Rd, 5 mi nw of Andes, Town of Delhi
367 Brooks 26 Jun 51--Brooks
Betty's Brook Rd, 1 1/2 mi s by w of W. Harpersfield, Town of Kortright
2989 Brooks 3 Jul 54--Brooks, NYS
3 mi e of Bloomville on Rt 28, Town of Kortright
3073 Brooks 8 Jul 54--NYS
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
4787 Brooks 12 May 67--NYS; 4869 Brooks 25 May 69--NYS, Brooks
Gregorytown, Town of Colchester
KLB obs 3 Jul 71
Foote Hollow Rd, 2 1/2 mi e of Hobart, Town of Stamford
KLB obs 20 Aug 72
7 1/2 mi s of Andes, Town of Andes
KLB obs 3 Jul 73
Vic of Fishs Eddy, Town of Hancock
KLB obs 8 Jul 73

Juglans cinerea

Vic of Apex, Town of Tompkins
KLB obs 8 Jul 73
2 mi n by e of Bovina Center, Town of Bovina
KLB obs 30 Jul 73
2 mi e by s of Davenport Center, Town of Davenport
KLB obs 24 Jun 74
1 1/2 mi w of Vega, Town of Roxbury
KLB obs 27 Jun 74
Vic of Delancey, Town of Hamden
KLB obs 28 Jul 74
3 mi e by s of Walton, Town of Walton
KLB obs 29 Jun 75
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
KLB obs 4 Aug 75
2 mi n of Trout Creek, Town of Masonville
KLB obs 7 Sep 75
4 mi sw of Trout Creek, Town of Deposit
KLB obs 7 Sep 75
3 mi n of Hobart, Town of Harpersfield
KLB obs 27 Jun 76
Vic of Sidney Center, Town of Sidney
KLB obs 6 Jul 76

Greene County

Plattekill Cove, vic of Tannersville, Town of Hunter
Anna M. Vail 23 Jul 1891--NY
Windham, Town of Windham
908 N. Taylor 29-31 Jul 09 at 1700 ft--NY
Prattsville, Town of Prattsville
KLB obs 19 Jun 73
3 mi e of West Kill, Town of Lexington
KLB obs 13 Jun 74
Elk Creek Rd, 2 mi ne of Halcott Center, Town of Halcott
KLB obs 18 Jun 75
Vic of Beaches Corners, Town of Jewett
KLB obs 4 Jul 75
2 mi n by e of Ashland, Town of Ashland
KLB obs 4 Jul 75

Schoharie County

Vic of S. Gilboa, Town of Gilboa
KLB obs 22 Sep 75

Sullivan County

2 mi n of N. Branch, Town of Callicoon
KLB obs 21 Jun 75
Vic of Lew Beach, Town of Rockland
6213 Brooks 15 Jun 76--NYS

Juglans cinerea

Vic of Tennanah L, Town of Fremont
  KLB obs 19 Jul 76
3 mi n of Woodbourne, Town of Fallsburg
  KLB obs 2 Aug 76
Vic of Grahamsville, Town of Neversink
  KLB & Paul Huth obs 19 Aug 76

Ulster County

Woodland Valley, 4 mi e of Phoenicia, Town of Shandaken
  O. P. Medsger in Mem. Torr. Bot. Club 17: 294-300, 1917.
Overlook Mt, Town of Woodstock
  KLB & Mary Domville obs 12 Jul 70
3 mi n of Tabasco, Town of Rochester
  KLB & Paul Huth obs 19 Aug 76
2 mi n of Ulster Heights, Town of Warwarsing
  KLB & Paul Huth obs 19 Aug 76

Carya ovata (continued from p. 273)

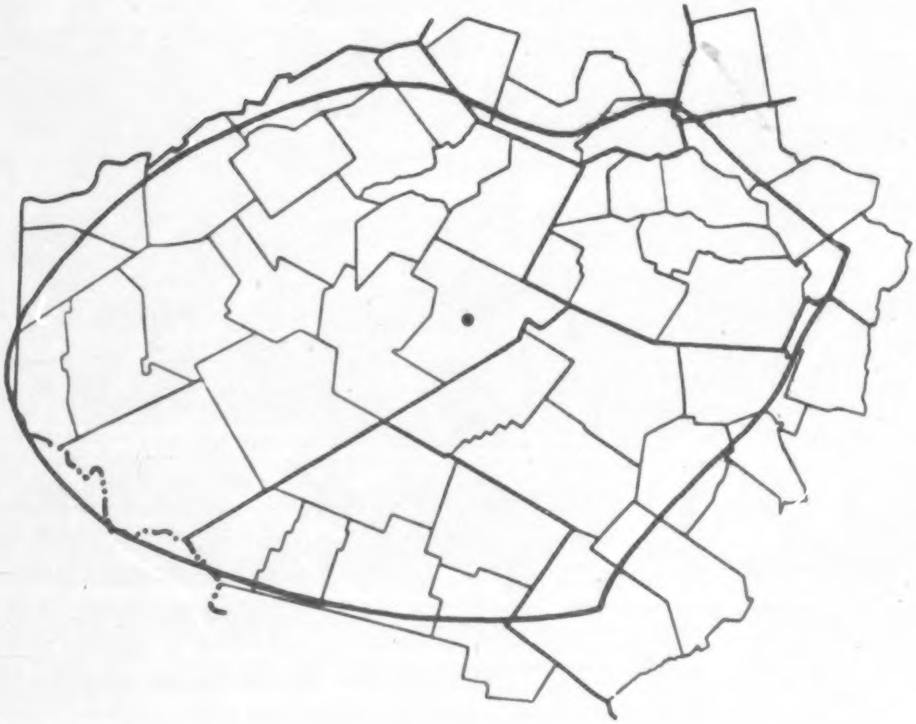
Schoharie County

Vic of W. Conesville, Town of Conesville
  KLB obs 1 Jul 75: 6188 Brooks 14 Sep 75--NYS

Ulster County

Overlook Mt, Town of Woodstock
  KLB & Mary Domville obs 12 Jul 70
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
  KLB & Claire Friedberg obs 18 Jul 73
3 mi nw of Tabasco, Town of Rochester
  KLB & Paul Huth obs 19 Aug 76
2 mi n of Ulster Heights, Town of Warwarsing
  KLB & Paul Huth obs 19 Aug 76

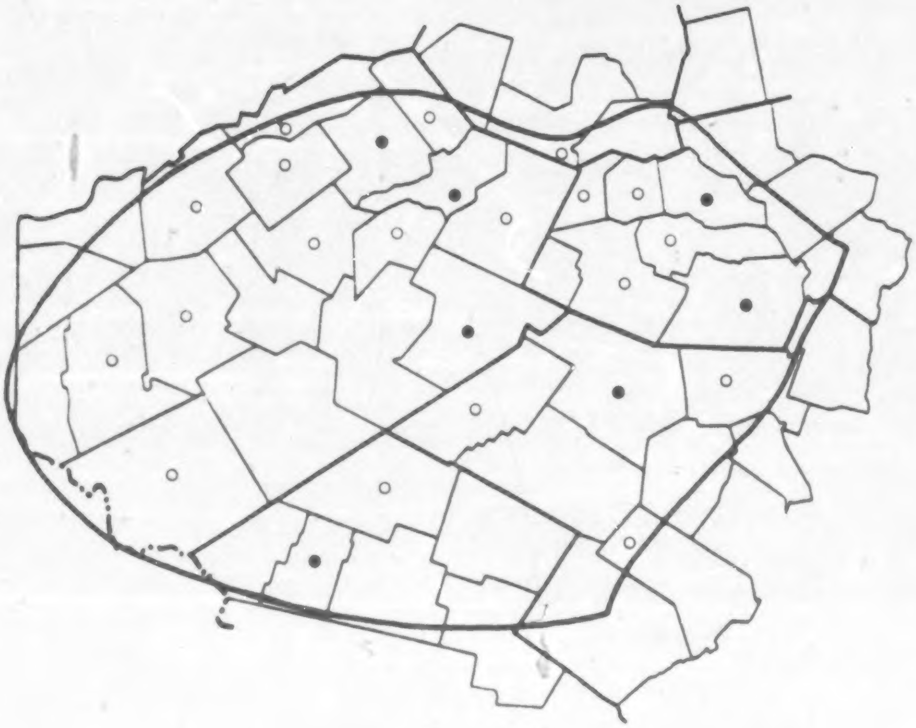
Juglans nigra L.
Black Walnut



Delaware County

Bull Run, 2 mi n of Margaretville, Town of Middletown
6291 Brooks & Hilde Arnao 5 Aug 78--NYS, Brooks

Alnus incana (L.) Moench
ssp. rugosa (DuRoi) Clausen
Speckled Alder



Delaware County

Stamford, Town of Stamford
374 N. Taylor 3 Jun 09 at 1300 ft--NY; 813 N. Taylor 3-10 Jul 09 at 1800 ft--NY
Arkville, Town of Middletown
P. Wilson 17 Jul 15--NY
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
703 Brooks 26 Jul 51--Brooks
Vic of Kilgour Spur, w of Cadosia, Town of Hancock
SJS obs 16-17 Jun 54
1/2 mi w by s of W. Harpersfield, Town of Kortright
4103 Brooks 9 Jun 56--NYS
Grand Gorge, Town of Roxbury
SJS obs 9 Sep 61
Vic of W. Harpersfield, Town of Harpersfield
Smith & DeGroot obs 20 Sep 63
Fraser, Town of Delhi
T115 Brooks 16 Apr 66

Alnus incana ssp. rugosa

Vic of Russ Gray Pond, Town of Walton
  KLB obs 29 Jun 75
E. Meredith, Town of Meredith
  KLB obs 1 Aug 75
Vic of Apex, Town of Tompkins
  KLB obs 27 Aug 75
1/2 mi s of Davenport, Town of Davenport
  KLB obs 30 Sep 75
Storey Place, 6 mi se of Franklin, Town of Franklin
  KLB obs 20 Jun 76
3 mi n of Bovina Center, Town of Bovina
  KLB obs 4 Sep 76

Greene County

Vic of Tannersville, Town of Hunter
  Anna M. Vail 21 Jul 1891--NY
Onteora, Town of Hunter
  E. P. Bicknell Sep 04--NY
Windham, Town of Windham
  1139 N. Taylor 6 Aug 09 at 1700 ft--NY
2 mi n of West Kill, Town of Lexington
  KLB obs 27 Jun 75
2 mi s of Jewett, Town of Jewett
  KLB obs 1 Jul 75
2 mi n by e of Ashland, Town of Ashland
  KLB obs 4 Jul 75
1 mi e of Red Falls, Town of Prattsville
  KLB obs 23 Sep 75

Schoharie County

5 mi ne of Grand Gorge, Town of Gilboa
  KLB obs 30 Sep 75

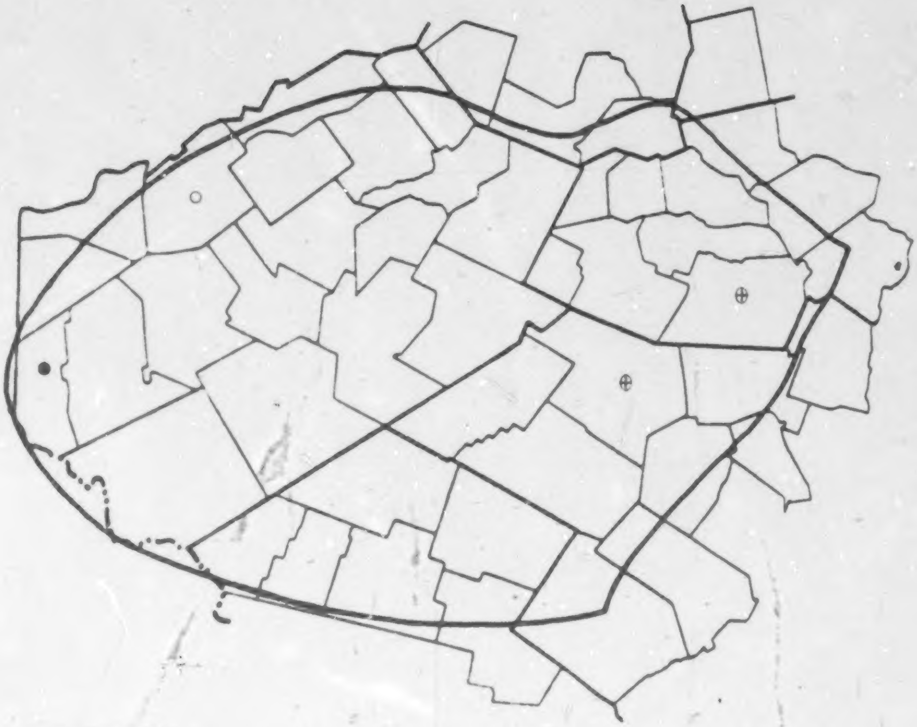
Sullivan County

Shore of L Shandelee, Town of Callicoon
  P. Wilson 14 Aug 18--NY
1 mi sw of Lew Beach, Town of Rockland
  KLB obs 3 Jun 74

Ulster County

Highmount, Town of Shandaken
  176A M. Domville 2 Aug 66--Domville
Wittenburg Rd, Wilson State Park, Town of Woodstock
  M. Domville [Plants of Wilson State Park, 26 Aug 72]
Vic of Hardenburgh, Town of Hardenburgh
  KLB obs 14 May 74
3 mi nw of Tabasco, Town of Rochester
  KLB & Paul Huth obs 19 Aug 76

Alnus serrulata (Ait.) Willd.
Smooth Alder

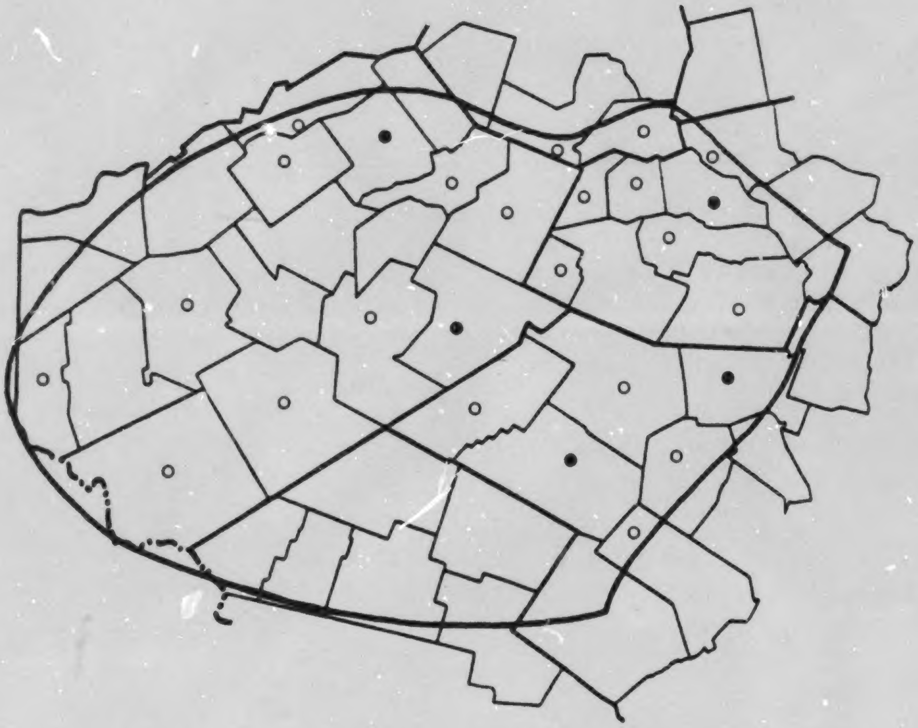


Delaware County
Franklin, Town of Franklin
M. Platt, 1840
Vic of Silver L, Town of Deposit
6182 Brooks 31 Aug 75--NYS, Brooks

Betula alba L. ssp. cordifolia (Regel) Regel. Mountain Birch (⊕)

Greene County
Haines Falls, Town of Hunter
W. C. Ferguson 1 Jul 19--NY
Hunter Mt, Town of Hunter
H. K. Svenson 22-29 Aug 31 in Torreya 31: 155, 1931.
Ulster County
Summit of Slide Mt, Town of Shandaken
1 N. Taylor 5 Sep 18--BKL; 1291 McIntosh 15 Jul 60--NYS

Betula alba L.
ssp. papyrifera (Marsh.) Regel
Paper Birch



Delaware County

Point Mt, Town of Hancock
SJS obs 17-18 Jun 54
Mt Utsayantha, 1 1/2 mi e by s of Stamford, Town of Stamford
KLB obs 3 Jul 54
Fracer Rd, 3 1/2 mi se of Doonan's Corners, Town of Kortright
3005 Brooks 5 Jul 54--NYS, Brooks
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
4881 Brooks 16 Jun 69--NYS
Gregorytown, Town of Colchester
KLB obs 3 Jul 71
Big Pond Rd, 14 mi s by e of Andes, Town of Andes
KLB obs 6 Jun 73
2 mi w by s of Grand Borge, Town of Roxbury
KLB obs 30 Jul 73
Emmons Pond, Town of Davenport
R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]

Betula alba ssp. papyrifera

3 mi w of Meridale, Town of Meredith
  KLB obs 14 Jul 74
Vic of Russ Gray Pond, Town of Walton
  KLB obs 29 Jun 75
Vic of Stilesville, Town of Deposit
  KLB obs 10 Aug 75

Greene County

Windham, Town of Windham
  1145 N. Taylor 7 Aug 09 at 1700 ft--NY
Kaaterskill Gorge, Town of Hunter
  SJS obs 28 May 52
Prattsville, Town of Prattsville
  KLB obs 4 Jul 75
Vic of Beaches Corners, Town of Jewett
  KLB obs 21 Jul 75
Steinfeld Place, 3 mi n of Halcott Center, Town of Halcott
  KLB obs 26 Jul 75
Vic of Ashland, Town of Ashland
  KLB obs 14 Sep 75
Vic of Durso Corner, Town of Durham
  KLB obs 26 Sep 75

Kudish (1971) reports "Paper birch" from several high peaks in the towns of Hunter, Jewett, Lexington, and Windham, but he does not distinguish ssp. cordifolia from ssp. papyrifera; these records could therefore not be indicated on the distribution maps.

Schoharie County

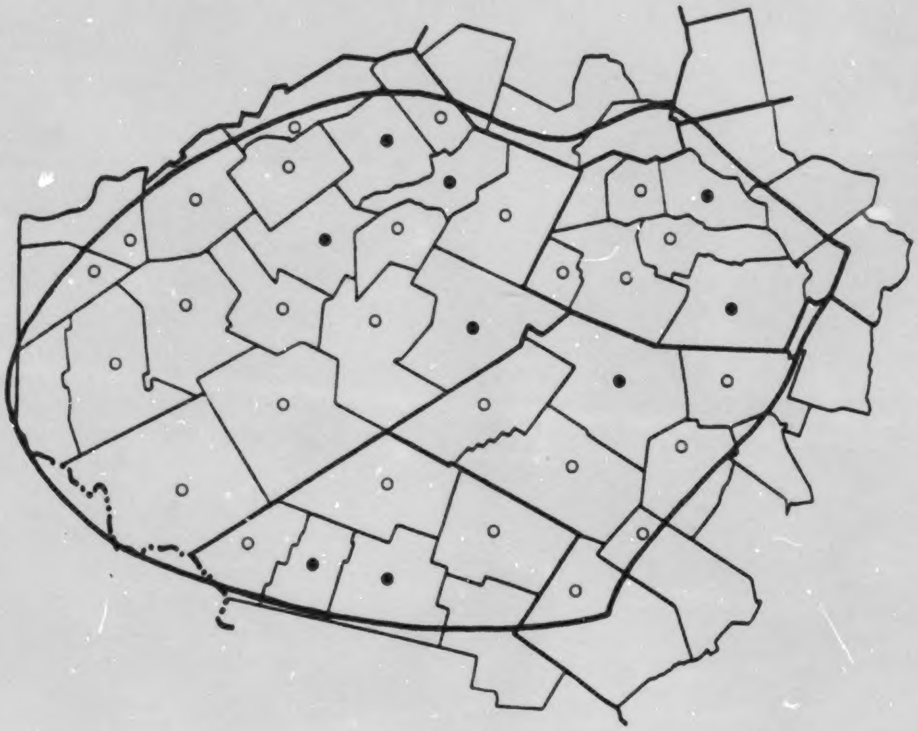
Vic of Conesville, Town of Conesville
  KLB obs 1 Jul 75
Vic of S. Gilboa, Town of Gilboa
  KLB obs 22 Sep 75

Ulster County

Woodland Valley, 4 mi e of Phoenicia, Town of Shandaken
  O. P. Medsger in Mem. Torr. Bot. Club 17: 294-300, 1917.
Peekamoose ravine, Town of Denning
  6 G. L. Stebbins Jr. 24 Jun 34--NYS
Lewis Hollow, Town of Woodstock
  125 M. Domville 20 Jun 66--NYS
Vic of Willow, Town of Woodstock
  KLB obs 30 May 73
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
  KLB & Claire Friedberg obs 18 Jul 73

(Continued on p. 285)

Betula alleghaniensis Britt.
Yellow Birch



Delaware County

Franklin, Town of Franklin
   M. Platt, 1840
Stamford, Town of Stamford
   307 N. Taylor 2 Jun 09 at 2000 ft--NY
Arkville, Town of Middletown
   P. Wilson 9 Jul 15--NY
Cameron Farm, 6 mi nw of Andes, Town of Delhi
   381 Brooks 27 Jun 51--Brooks
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
   633 Brooks 24 Jul 51--NYS
Hoff Farm, 2 1/2 mi nw of Bovina Center, Town of Bovina
   KLB obs 14 Jul 54
S of Shinhopple, Town of Hancock
   SJS obs 10 Aug 55
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
   KLB obs 10 Jul 59

Betula alleghaniensis

Big Pond Rd, 14 mi s by e of Andes, Town of Andes
KLB obs 6 Jun 73
4 mi se of Downsville, Town of Colchester
KLB obs 12 Jun 73
Emmons Pond, Town of Davenport
R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]
1 1/2 mi w of Vega, Town of Roxbury
KLB obs 27 Jun 74
Vic of Launt Pond, Town of Walton
KLB obs 28 Jul 74
Bush Clove, 4 mi se of Delancey, Town of Hamden
KLB obs 16 Aug 74
3 mi n of Hobart, Town of Harpersfield
KLB obs 21 May 75
Vic of Sidney Center, Town of Sidney
KLB obs 7 Sep 75
2 mi sw of Meridale, Town of Meredith
KLB obs 21 May 76
3 mi se of Masonville, Town of Masonville
KLB obs 6 Jul 76

Greene County

High Peak, Town of Windham
W. H. Leggett Aug 1872--NY
Onteora, Town of Hunter
Anna M. Vail 13 Jun 1891--NY
Windham, Town of Windham
394 N. Taylor 28-31 Jul 09 at 1700 ft--NY; 992 N. Taylor 31 Jul 09 at 2200 ft--NY
Maplecrest, Town of Windham
Alexandra Dodd 10 Jul 27--NY
Hunter Mt, Town of Hunter
H. K. Svenson 22-29 Aug 31 in Torreya 31: 154-157, 1931.
Plateau, Twin Peak, Sugarloaf & Indian Head mts, Town of Hunter
Kudish (1971), pp. 24, 124, 170.
Rusk, North Dome, Sherrill & Halcott mts, Town of Lexington
Kudish (1971), p. 171.
Thomas Cole Mt, Town of Windham
Kudish (1971), p. 170.
3 mi n of Halcott Center, Town of Halcott
KLB obs 31 May 75
Vic of Beaches Corners, Town of Jewett
KLB obs 4 Jul 75
Vic of E. Ashland, Town of Ashland
KLB obs 4 Jul 75

Sullivan County

Revonah L, Town of Liberty
F. H. Kretz 14 Aug 1893--NY

Betula alleghaniensis

Vic of L Shandelee, Town of Callicoon
   P. Wilson 18 Aug 18--NY
Fir Brook Swamp, ne of Willowemoc, Town of Neversink
   SJS obs 10 May 50
Between N. Branch & Jeffersonville, Town of Callicoon
   2043 S. J. Smith 23 Jun 56--NYS
1 mi sw of Lew Beach, Town of Rockland
   KLB obs 3 Jun 74
Vic of Tennanah L, Town of Fremont
   KLB obs 19 Jul 76

Ulster County

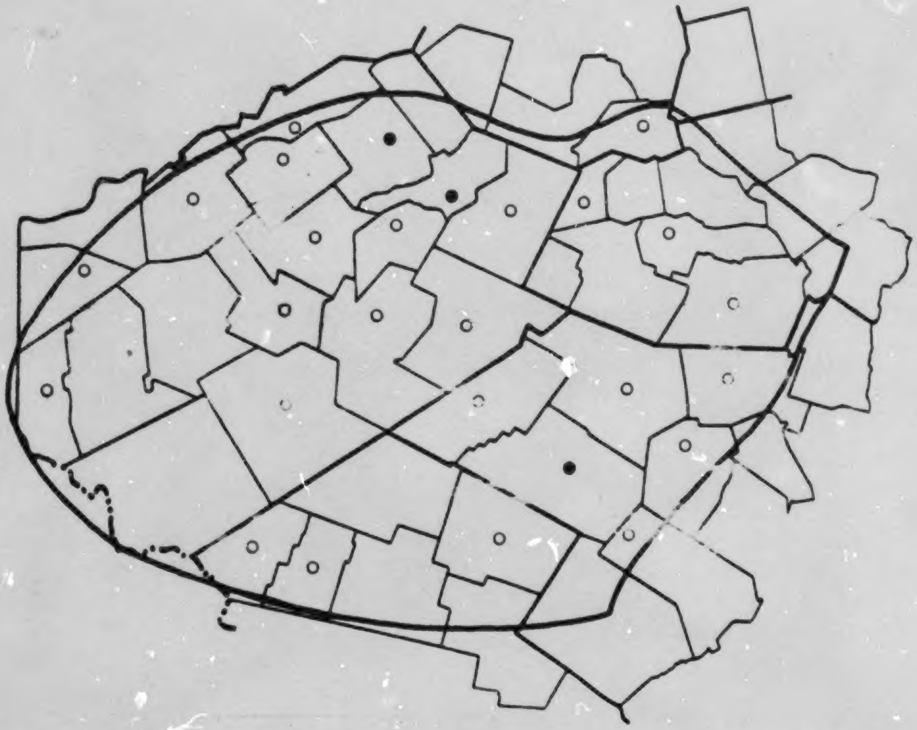
Slide Mt, Town of Shandaken
   N. L. Britton 31 May 01--NY; 19 N. Taylor 5 Sep 18--BKL
Slide, Hemlock, Spruce, Fir & Belle Ayre mts, Town of Shandaken
   Kudish (1971), pp. 125, 170, 20.
Big Indian, Graham & Schoolhouse mts, Town of Denning
   Kudish (1971), pp. 125, 170.
Doubletop, Eagle, Balsam Lake & Balsam Mt, Town of Hardenburgh
   Kudish (1971), pp. 125, 170.
Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
   KLB obs 26 Aug 72
Vic of Boiceville, Town of Olive
   KLB obs 23 Jul 74
2 mi n of Ulster Heights, Town of Warwarsing
   KLB & Paul Huth obs 19 Aug 76
3 mi nw of Tabasco, Town of Rochester
   KLB & Paul Huth obs 19 Aug 76

Betula alba papyrifera (continued from p. 282)

1 mi ne of Dry Brook, Town of Hardenburgh
   KLB obs 8 Jul 75
3 mi nw of Tabasco, Town of Rochester
   KLB & Paul Huth obs 19 Aug 76

Kudish (1971) reports "Paper birch" from Balsam Cap, Town of Olive, and from several high peaks in the Town of Shandaken, but no distinction is made between ssp. cordifolia and ssp. papyrifera; these records could therefore not be plotted on the distribution maps.

Betula lenta L.
Black Birch



Delaware County

Stamford, Town of Stamford
663 N. Taylor 3-10 Jul 09 at 1800 ft--NY
Delhi, Town of Delhi
N. Hotchkiss obs 10 May 27
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
2747 Brooks 30 May 54--NYS
Fraser Rd, 3 1/2 mi se of Doonan's Corners, Town of Kortright
3004 Brooks 5 Jul 54--NYS; 3030 Brooks 6 Jul 54--NYS, Brooks
Farmers Hill, 3 mi e by s of Andes, Town of Andes
KLB obs 18 Jun 55
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
KLB obs 10 Jul 59
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
BW3-07 & BW3-08 Brooks 4 Jul 68
Delancey, Town of Hamden
KLB obs 7 Aug 71

Betula lenta

6 mi e of Downsville, Town of Colchester
KLB obs 12 Jun 73
Emmons Pond, Town of Davenport
R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]
1 1/2 mi ne of Bovina, Town of Bovina
KLB obs 16 May 74
2 mi s of E. Meredith, Town of Meredith
KLB obs 1 Aug 75
Vic of Silver L, Town of Deposit
KLB obs 31 Aug 75
3 mi nw of Trout Creek, Town of Masonville
KLB obs 7 Sep 75
2 mi w of Vega, Town of Roxbury
KLB obs 13 May 76

Greene County

Hillyer Ravine, vic of Haines Falls, Town of Hunter
Smith & Phelps obs 27 May 65
2 mi s of Jewett, Town of Jewett
KLB obs 1 Jul 75

Schoharie County

Vic of W. Conesville, Town of Conesville
KLB obs 14 Sep 75

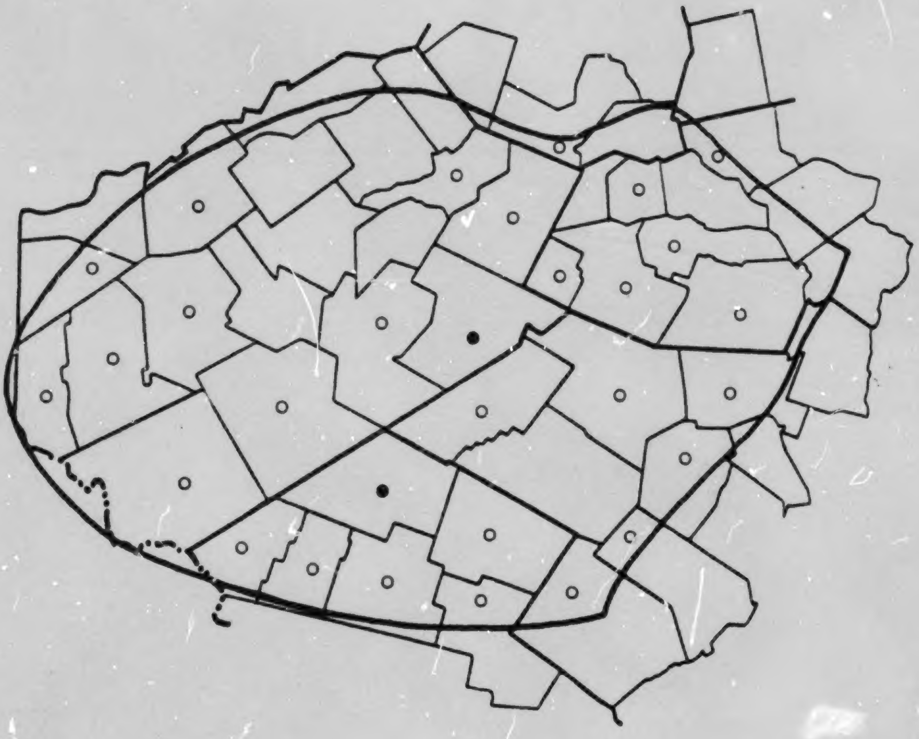
Sullivan County

2 1/2 mi s of Claryville, Town of Neversink
KLB obs 10 Jun 75
3 mi s by w of Livingston Manor, Town of Callicoon
KLB obs 15 Jun 76
Vic of Long Eddy, Town of Fremont
KLB obs 19 Jul 76

Ulster County

Woodland Valley, 4 mi e of Phoenicia, Town of Shandaken
O. P. Medsger in Mem. Torr. Bot. Club 17: 294-300, 1917.
Peekamoose ravine, Town of Denning
7 G. L. Stebbins Jr. 24 Jun 34--NYS
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
KLB & Claire Friedberg obs 5 Jun 74
Vic of Dry Brook, Town of Hardenburgh
KLB obs 22 May 76
3 mi nw of Tabasco, Town of Rochester
KLB & Paul Huth obs 19 Aug 76

Betula populifolia Marsh.
Gray Birch



Delaware County

Franklin, Town of Franklin
M. Platt, 1840
Walling Place, 1 mi n of Fleischmanns, Town of Middletown
5090 Brooks 24 Jun 72--NYS, Brooks
1 1/2 mi s of Andes, Town of Andes
KLB obs 14 Jul 73
Vic of Launt Pond, Town of Walton
KLB obs 28 Jul 74
3 mi ne of Downsville, Town of Colchester
KLB obs 11 May 75
3 mi se of Grand Gorge, Town of Roxbury
KLB obs 4 Jul 75
Vic of Chamberlain Brook, Town of Tompkins
KLB obs 31 Aug 75
Vic of Silver L, Town of Deposit
KLB obs 31 Aug 75

etula populifolia

1 1/2 mi e of Bloomville, Town of Stamford
   KLB obs 4 Jun 76
5 mi se of Hancock, Town of Hancock
   KLB obs 19 Jul 76

Greene County

South L, Town of Hunter
   SJS obs 7 Sep 57
1 1/2 mi e of Lexington, Town of Lexington
   KLB obs 19 Jun 73
2 mi n of Halcott Center, Town of Halcott
   KLB obs 25 Jun 73
2 mi s of Jewett, Town of Jewett
   KLB obs 1 Jul 75
Vic of E. Ashland, Town of Ashland
   KLB obs 4 Jul 75
Vic of Durso Corner, Town of Durham
   KLB obs 2 May 76

Schoharie County

Vic of S. Gilboa, Town of Gilboa
   KLB obs 22 Sep 75

Sullivan County

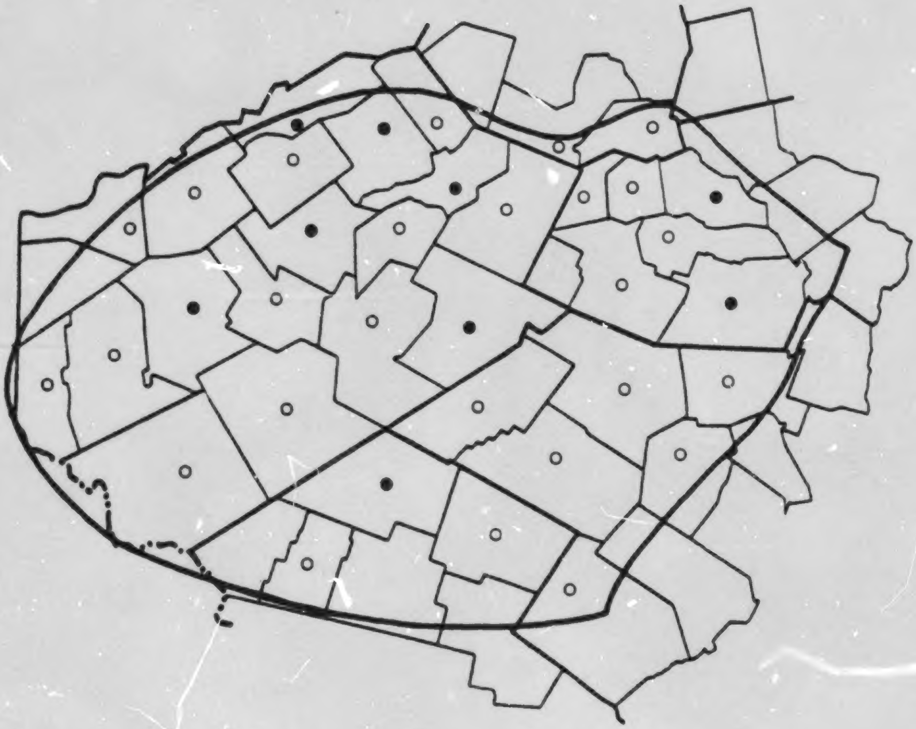
Vic of Roscoe, Town of Rockland
   P. Wilson 27 Aug 18--NY
Vic of Grahamsville, Town of Neversink
   KLB obs 10 Jun 75
2 mi n of N. Branch, Town of Callicoon
   KLB obs 21 Jun 75
Vic of Parksville, Town of Liberty
   KLB obs 28 Jul 75
Vic of Tennanah L, Town of Fremont
   KLB obs 19 Jul 76
Vic of Loch Sheldrake, Town of Fallsburg
   KLB obs 2 Aug 76

Ulster County

Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
   KLB & Mary Domville obs 26 Aug 72
Vic of Oliverea, Town of Shandaken
   KLB obs 5 Aug 73
Vic of Boiceville, Town of Olive
   KLB obs 9 May 75
Rider Hollow, 1 mi e of Dry Brook, Town of Hardenburgh
   KLB obs 7 Jun 75

(Continued on p. 292)

Carpinus caroliniana Walt.
Blue Beech



Delaware County

Arkville, Town of Middletown
390 N. Taylor 3-4 Jun 09 at 1400 ft--NY: P. Wilson 3 Jul 15--NY
Stamford, Town of Stamford
598 N. Taylor 3-10 Jul 09 at 2300 ft--NY
Gully Rd, e of Davenport, Town of Davenport
5049 E. Whitney 17 Jun 36--NYS
Along Delaware R, 1 mi s of Delhi, Town of Delhi
1919 Brooks 16 Aug 52--NYS; 1923 Brooks 16 Aug 52--NYS
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
2748 & 2749 Brooks 30 May 54--NYS; 3035 Brooks 6 Jul 54--Brooks
Hoff Farm, 2 1/2 mi nw of Bovina Center, Town of Bovina
KLB obs 14 Jul 54
Kilgour Spur, w of Cadosia, Town of Hancock
SJS obs 10 Aug 55
Pines Brook, vic of Walton, Town of Walton
A. E. Jenkins 17 Sep 63--NYS

Carpinus caroliniana

Rosa Farm, 1 mi s of Margaretville, Town of Middletown
BW3-12 Brooks 4 Jul 68
Gregorytown, Town of Colchester
KLB obs 3 Jul 71
Delancey, Town of Hamden
KLB obs 7 Aug 71
Big Pond Rd, 14 mi s by e of Andes, Town of Andes
KLB obs 6 Jun 73
Emmons Pond, Town of Davenport
R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]
1 1/2 mi w of Vega, Town of Roxbury
KLB obs 27 Jun 74
2 mi s of N. Franklin, Town of Franklin
KLB obs 14 Jul 74
E. Meredith, Town of Meredith
KLB obs 1 Aug 75
Vic of Sidney Center, Town of Sidney
KLB obs 7 Sep 75
4 mi sw of Trout Creek, Town of Deposit
KLB obs 7 Sep 75
Vic of Harpersfield Center, Town of Harpersfield
KLB obs 4 Sep 76

Greene County

Tannersville, Town of Hunter
Anna M. Vail 14 Jun 1891--NY
Windham, Town of Windham
867 N. Taylor 28-31 Jul 09 at 1700 ft--NY
Mt Pisgah, Town of Windham
1065 N. Taylor 3 Aug 09 at 2900 ft--NY
1/2 mi n of Bushnellsville, Town of Lexington
SJS obs 15 Jun 56
3 mi e of Jewett Center, Town of Jewett
KLB obs 10 Sep 74
Vic of E. Ashland, Town of Ashland
KLB obs 4 Jul 75
Prattsville, Town of Prattsville
KLB obs 4 Jul 75

Schoharie County

Vic of Manorkill, Town of Conesville
KLB obs 1 Jul 75
1 mi se of Gilboa, Town of Gilboa
KLB obs 17 Aug 76

Sullivan County

Vic of Roscoe, Town of Rockland
P. Wilson 27 Aug 18--NY

Carpinus caroliniana

Vic of Claryville, Town of Neversink
  KLB obs 11 Jun 74
2 mi n of N. Branch, Town of Callicoon
  KLB obs 21 Jun 75

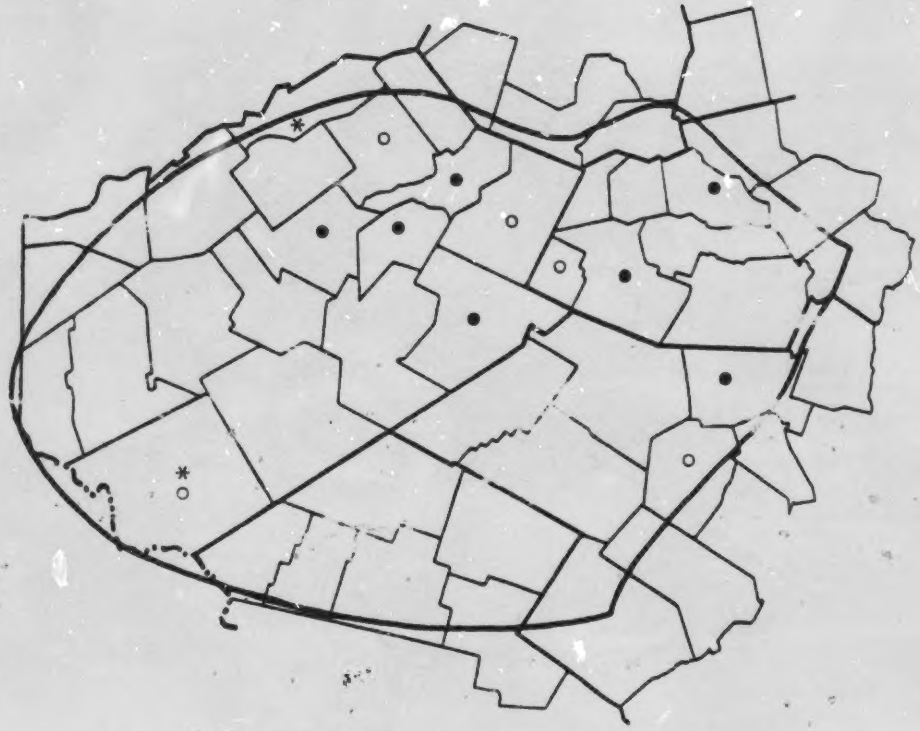
Ulster County

Woodland Valley, 4 mi e of Phoenicia, Town of Shandaken
  O. P. Medsger in Mem. Torr. Bot. Club 17: 294-300, 1917.
Overlook Mt, Town of Woodstock
  KLB & Mary Domville obs 12 Jul 70
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
  KLB & Claire Friedberg obs 18 Jul 73
Vic of Hardenburgh, Town of Hardenburgh
  KLB obs 14 May 74
Vic of Frost Valley Camp, Town of Denning
  KLB obs 11 Jun 74
2 mi n of Ulster Heights, Town of Warwarsing
  KLB & Paul Huth obs 19 Aug 76

Betula populifolia (continued from p. 289)

3 mi nw of Tabasco, Town of Rochester
  KLB & Paul Huth obs 19 Aug 76
2 mi n of Ulster Heights, Town of Warwarsing
  KLB & Paul Huth obs 19 Aug 76

Corylus americana Walt. (*)
American Hazelnut



Delaware County

Kilgour Spur, Town of Hancock
   SJS obs 17-18 Jun 54
Emmons Pond, Town of Davenport
   R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]

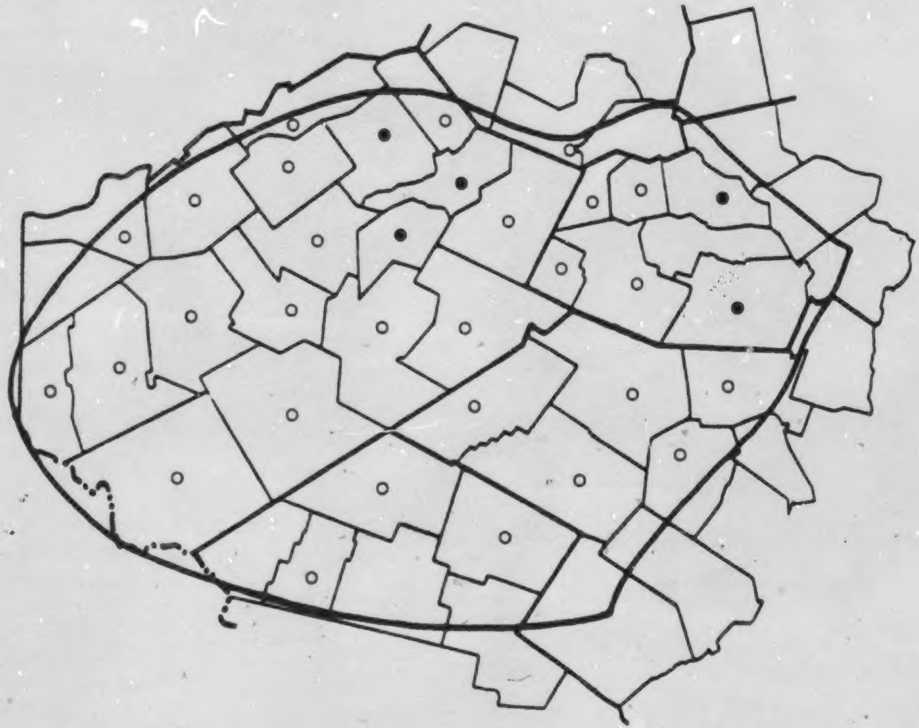
Corylus cornuta Marsh. Beaked Hazelnut (●, ○)

Delaware County

Stamford, Town of Stamford
   665 N. Taylor 3-10 Jul 09 at 1800 ft--NY
Arkville, Town of Middletown
   P. Wilson 10 Jul 15--NY
Hoff Farm, 2 1/2 mi nw of Bovina Center, Town of Bovina
   3109 Brooks 14 Jul 54--NYS, Brooks

(Continued on p. 296)

Ostrya virginiana (Mill.) K. Koch
Ironwood



Delaware County

Franklin, Town of Franklin
M. Platt, 1840
Bovina, Town of Bovina
D. F. Hoy Jul 1891--MIN
Stamford, Town of Stamford
728 N. Taylor 3-10 Jul 09 at 2500 ft--NY
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
609 Brooks 23 Jul 51--NYS; 1221 Brooks 3 May 52--NYS; 2746 Brooks 30 May 54--NYS; 3036 Brooks 6 Jul 54--Brooks
E of Kilgour Spur, Town of Hancock
SJS obs 17-18 Jun 54
Scotch Mt, 3 1/2 mi ne of Delancey, Town of Delhi
KLB obs 12 Jul 54
1 mi s of W. Harpersfield, Town of Harpersfield
KLB obs 2 Jul 55
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
T415 Brooks 22 Jun 69; T416 Brooks 22 Jun 69; T464 Brooks 10 May 70

Ostrya virginiana

Big Pond Rd, 14 mi s by e of Andes, Town of Andes
KLB obs 6 Jun 73
Emmons Pond, Town of Davenport
R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]
3 mi s of Grand Gorge, Town of Roxbury
KLB obs 17 Sep 73
Vic of Downsville, Town of Colchester
KLB obs 30 May 74
2 mi s of E. Meredith, Town of Meredith
KLB obs 24 Jun 74
Vic of Russ Gray Pond, Town of Walton
KLB obs 29 Jun 75
Vic of Sidney Center, Town of Sidney
KLB obs 7 Sep 75
Vic of Delancey, Town of Hamden
KLB obs 30 May 76
6 mi ne of Hambleville, Town of Deposit
KLB obs 6 Jul 76

Greene County

Onteora, Town of Hunter
Anna M. Vail 14 Jul 1891 & 4 Sep 1891--NY
Windham, Town of Windham
939 N. Taylor 28-31 Jul 09 at 1700 ft--NY
Mt Pisgah, Town of Windham
1064 N. Taylor 3 Aug 09 at 2900 ft--NY
Maplecrest, Town of Windham
Alexandra Dodd 10 Jul 27--NY
2 mi s by w of West Kill, Town of Lexington
KLB obs 27 May 75
Vic of E. Ashland, Town of Ashland
KLB obs 4 Jul 75
Prattsville, Town of Prattsville
KLB obs 4 Jul 75
Steinfeld Place, 3 mi n of Halcott Center, Town of Halcott
KLB obs 26 Jul 75

Schoharie County

1 mi se of Gilboa, Town of Gilboa
KLB obs 17 Aug 76

Sullivan County

2 1/2 mi s of Claryville, Town of Neversink
KLB obs 10 Jun 75
Vic of N. Branch, Town of Callicoon
KLB obs 21 Jun 75
Beaverkill Campsite, Town of Rockland
KLB obs 20 Aug 75

Ostrya virginiana

Ulster County

Overlook Mt, Town of Woodstock
KLB & Mary Domville obs 12 Jul 70
Huth Place, 1 1/2 mi s of Pine Hill, Town of Shandaken
KLB & Paul Huth obs 17 Sep 72
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
KLB & Claire Friedberg obs 18 Jul 73
Dry Brook, Town of Hardenburgh
KLB obs 28 May 74
5 mi s of Frost Valley Camp, Town of Denning
KLB obs 10 Jun 75

Corylus cornuta (continued from p. 293)

Kilgour Spur, w of Cadosia, Town of Hancock
SJS obs 10 Aug 54
Delhi, Town of Delhi
4564 Brooks 5 Sep 59--NYS
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
T70 Brooks 19 Jul 64; BW1-10 Brooks 15 Aug 64

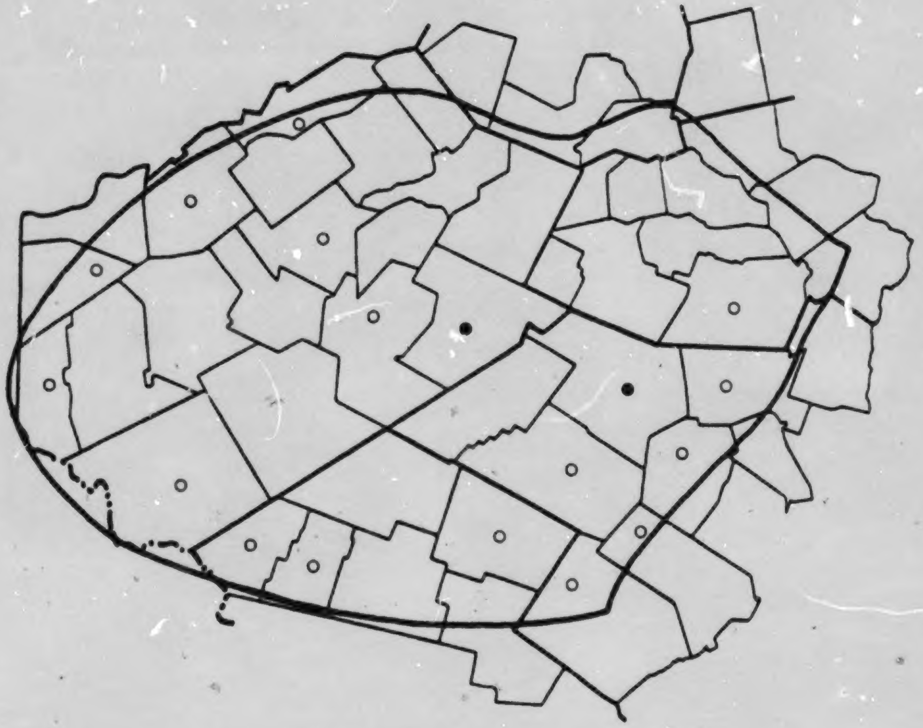
Greene County

Maplecrest, Town of Windham
Alexander Dodd 10 Jul 27--NY
3 mi e of West Kill, Town of Lexington
6009 Brooks 13 Jun 74--NYS
Steinfeld Place, 3 mi n of Halcott Center, Town of Halcott
KLB obs 26 Jul 75

Ulster County

E slope of Overlook Mt, Town of Woodstock
4666 H. K. Svenson 28 Aug 31 at 2000 ft--BKL
Summit of High Point Mt, Town of Olive
D[aniel] S[miley] obs 28 Jul 64

Castanea dentata (Marsh.) Borkh.
American Chestnut



Delaware County

Franklin, Town of Franklin
  M. Platt, 1840
Arkville, Town of Middletown
  P. Wilson 21 Jul 15--NY
Kilgour Spur, w of Cadosia, Town of Hancock
  SJS obs 10 Aug 55
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
  4882 Brooks 16 Jun 69--NYS, Brooks
Emmons Pond, Town of Davenport
  R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]
7 mi s by w of Andes, Town of Andes
  KLB obs 30 Jul 75
3 mi se of Masonville, Town of Masonville
  KLB obs 6 Jul 76
6 mi ne of Hambleville, Town of Deposit
  KLB obs 6 Jul 76

Castanea dentata

Greene County

South L, Town of Hunter
SJS obs 7 Sep 57

Schoharie County

Vic of S. Gilboa, Town of Gilboa
KLB obs 22 Sep 75

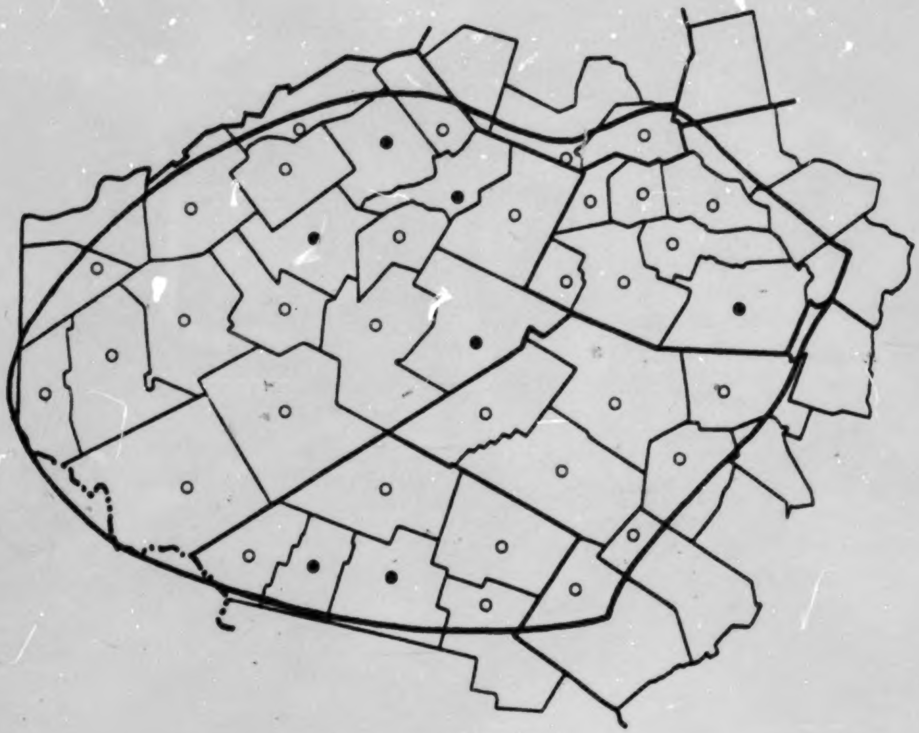
Sullivan County

Fir Brook Swamp, ne of Willowemoc, Town of Neversink
SJS obs 10 May 50
4 mi ne of Callicoon, Town of Callicoon
SJS obs 7 Aug 56

Ulster County

Woodland Valley, 4 mi e of Phoenicia, Town of Shandaken
O. P. Medsger in Mem. Torr. Bot. Club 17: 294-300, 1917.
Vic of Woodland [Valley], Town of Shandaken
6823 Smith & Boscom 16 Jun 50--NYS
Overlook Mt, Town of Woodstock
KLB & Mary Domville obs 12 Jul 70; Kudish (1971), p. 140.
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
KLB & Claire Friedberg obs 18 Jul 73
Vic of Bull Run, Town of Denning
KLB obs 10 Jun 75
2 mi n of Ulster Heights, Town of Warwarsing
KLB & Paul Huth obs 19 Aug 76
3 mi nw of Tabasco, Town of Rochester
KLB & Paul Huth obs 19 Aug 76

Fagus grandifolia Ehrh.
American Beech



Delaware County

Franklin, Town of Franklin
   M. Platt, 1840
Arkville, Town of Middletown
   387 N. Taylor 3-4 Jun 09 at 1400 ft--NY
Stamford, Town of Stamford
   680 N. Taylor 3-10 Jul 09 at 1800 ft--NY
Bullet Hollow Rd, 5 mi nw of Andes, Town of Delhi
   374 Brooks 26 Jun 51--NYS
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
   618 Brooks 23 Jul 51--NYS, Brooks
Hoff Farm, 2 1/2 mi nw of Bovina Center, Town of Bovina
   KLB obs 14 Jul 54
Platte Kill, 1 1/2 mi n of Dunraven, Town of Middletown
   KLB obs 18 Jun 55
1 mi s of W. Harpersfield, Town of Harpersfield
   KLB obs 2 Jul 55

Fagus grandifolia

1 mi e of Kortright Center, Town of Kortright
4380 Brooks 12 Jul 58--NYS
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
KLB obs 10 Jul 59
2 mi e of Downsville on Rte 30, Town of Colchester
KLB obs 19 Jun 71
Coe Hill Rd, 4 mi sw of W. Davenport, Town of Davenport
KLB obs 7 Aug 71
Feak Hollow Rd, 4 mi nw of Hamden, Town of Hamden
KLB obs 19 Aug 72
S. Kortright Rd, 3 1/2 mi w by n of Roxbury, Town of Roxbury
KLB obs 20 Aug 72
Big Pond Rd, 14 mi s by e of Andes, Town of Andes
KLB obs 6 Jun 73
Klondike Rd, 5 mi s of East Branch, Town of Hancock
KLB obs 8 Jul 73
Emmons Pond, Town of Davenport
R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]
2 mi s of E. Meredith, Town of Meredith
KLB obs 24 Jun 74
Vic of Launt Pond, Town of Walton
KLB obs 28 Jul 74
7 mi e by n of Deposit, Town of Tompkins
KLB obs 10 Aug 75
3 mi nw of Trout Creek, Town of Masonville
KLB obs 7 Sep 75
4 mi sw of Trout Creek, Town of Deposit
KLB obs 7 Sep 75

Greene County

Vic of Tannersville, Town of Hunter
Anna M. Vail Sep 1891--NY
Tannersville, Town of Hunter
274 N. Taylor 1 Jun 09 at 1864 ft--NY
Halcott & Sherrill mts, Town of Lexington
Kudish (1971), pp. 124, 171
Acra Point & Burnt Knob mts, Town of Windham
Kudish (1971), p. 170
Prattsville, Town of Prattsville
KLB obs 19 Jun 73
3 mi e of Jewett Center, Town of Jewett
KLB obs 10 Sep 74
3 mi n of Halcott Center, Town of Halcott
KLB obs 31 May 75
2 mi n by e of Ashland, Town of Ashland
KLB obs 4 Jul 75

Fagus grandifolia

Schoharie County

Vic of W. Conesville, Town of Conesville
   KLB obs 1 Jul 75
Vic of S. Gilboa, Town of Gilboa
   KLB obs 22 Sep 75

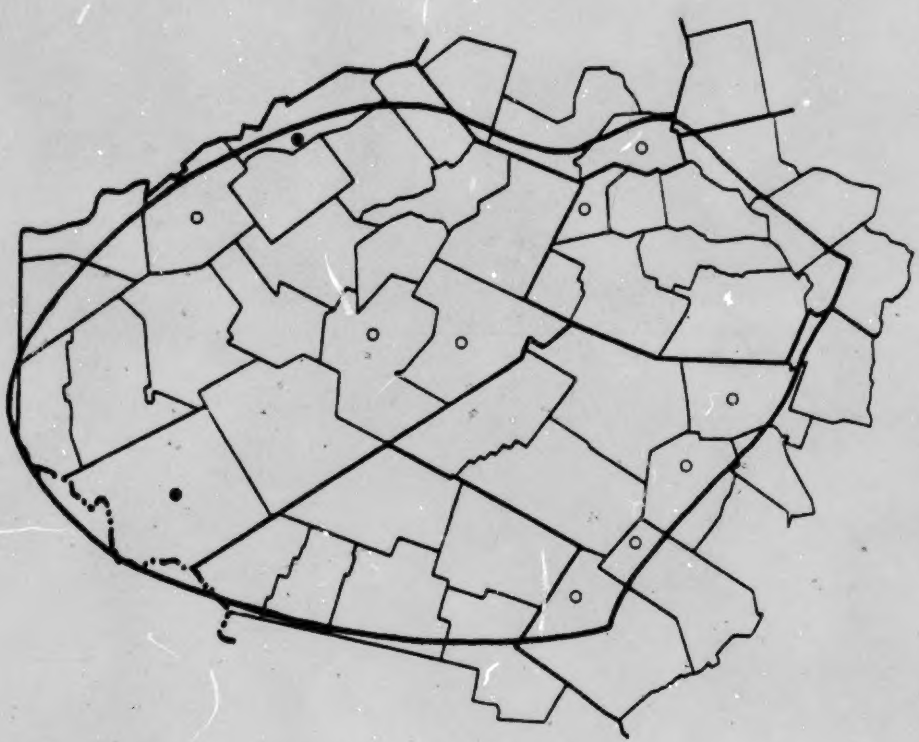
Sullivan County

Vic of L Shandelee, Town of Callicoon
   P. Wilson 18 Aug 18--NY
Fir Brook Swamp, ne of Willowemoc, Town of Neversink
   SJS obs 10 May 50
N of Liberty, Town of Liberty
   6788 Smith & Boscom 15 Jun 50--NYS
Long Eddy, Town of Fremont
   SJS obs 20-22 Jun 56
Between Jeffersonville & N. Branch, Town of Callicoon
   SJS obs 20-22 Jun 56
1 mi sw of Lew Beach, Town of Rockland
   KLB obs 3 Jun 74
3 mi n of Woodbourne, Town of Fallsburg
   KLB obs 2 Aug 76

Ulster County

Belle Ayre Mt, Town of Shandaken
   SJS obs 15 Aug 52
Overlook Mt, Town of Woodstock
   KLB & Mary Domville obs 12 Jul 70
Slide, Hemlock, Spruce, Fir & Belle Ayre mts, Town of Shandaken
   Kudish (1971), pp. 20, 125, 170.
Big Indian & Schoolhouse mts, Town of Denning
   Kudish (1971), pp. 125, 170.
Balsam, Balsam L & Eagle mts, Town of Hardenburgh
   Kudish (1971), pp. 125, 128, 170.
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
   KLB & Claire Friedberg obs 18 Jul 73
3 mi nw of Tabasco, Town of Rochester
   KLB & Paul Huth obs 19 Aug 76
2 mi n of Ulster Heights, Town of Warwarsing
   KLB & Paul Huth obs 19 Aug 76

Quercus alba L.
White Oak

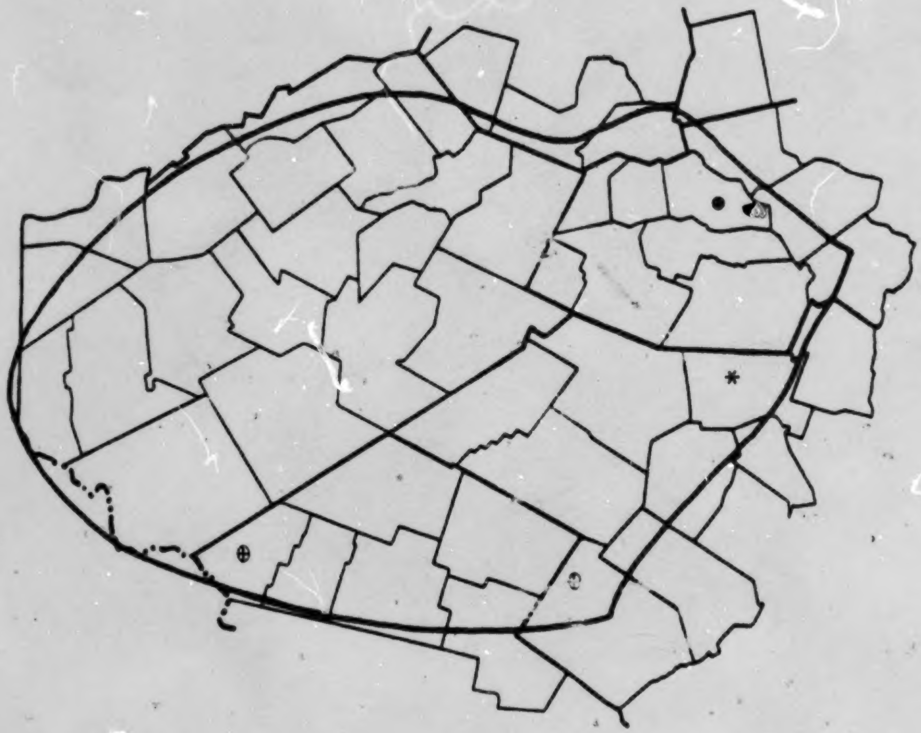


Delaware County

Franklin, Town of Franklin
M. Platt, 1840
E of Kilgour Spur, Town of Hancock
SJS obs 17-18 Jun 54
Rathbone Rd, 1 1/4 mi se of Pindars Corners, Town of Davenport
4994 Brooks 15 Aug 70--NYS, Brooks
Storey Farm, 3 1/2 mi s of Margaretville, Town of Middletown
KLB obs 22 Aug 71
3 mi sw of Franklin, Town of Franklin
KLB obs 6 Jul 76
Weaver Hollow, 5 mi e of Andes, Town of Andes
KLB obs 23 Jul 76

(Continued on p. 305)

Quercus coccinea Muench.
Scarlet Oak



Greene County

South Mt, vic of Windham, Town of Windham
997 N. Taylor 21 Jul 09 at 2500 ft--NY

Quercus ilicifolia Wang. Scrub Oak (⊕, *)

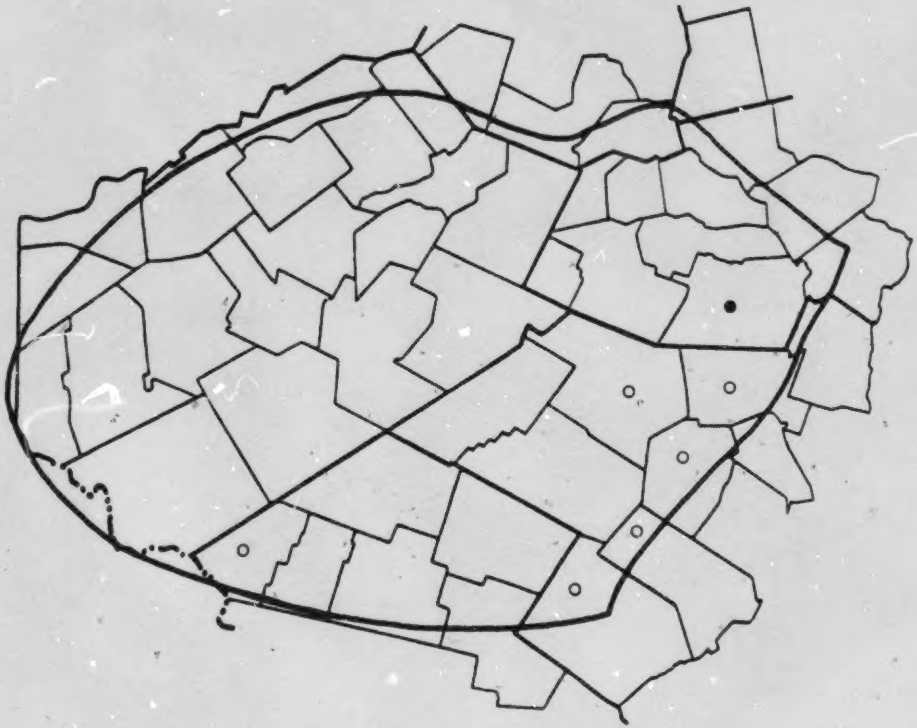
Sullivan County

Vic of Hankins, Town of Fremont
6237 Brooks 19 Jul 76--NYS, Brooks

Ulster County

Lackawack, Town of Warwarsing
8 G. L. Stebbins 24 Jun 34--NYS
Overlook Mt, Town of Woodstock
KLB & Mary Domville obs 12 Jul 70

Quercus prinus L.
Chestnut Oak



Greene County

Plattekill Cove, Town of Hunter
Anna M. Vail 23 Jul 1891--NY
S of Haines Falls, Town of Hunter
Crockett 11 Sep 38--NYS

Sullivan County

Vic of Hankins, Town of Fremont
KLB obs 19 Jul 76

Ulster County

Overlook Mt, Town of Woodstock
KLB & Mary Domville obs 12 Jul 70
Mt Tremper, Town of Shandaken
Kudish (1971), p. 139.

Quercus prinus

1 mi w of Boiceville, Town of Olive
   KLB & Claire Friedberg obs 2 Jul 76
3 mi nw of Tabasco, Town of Rochester
   KLB & Paul Huth obs 19 Aug 76
2 mi n of Ulster Heights, Town of Warwarsing
   KLB & Paul Huth obs 19 Aug 76

Quercus alba (continued from p. 302)

Greene County

Prattsville, Town of Prattsville
   KLB obs 8 Jun 76

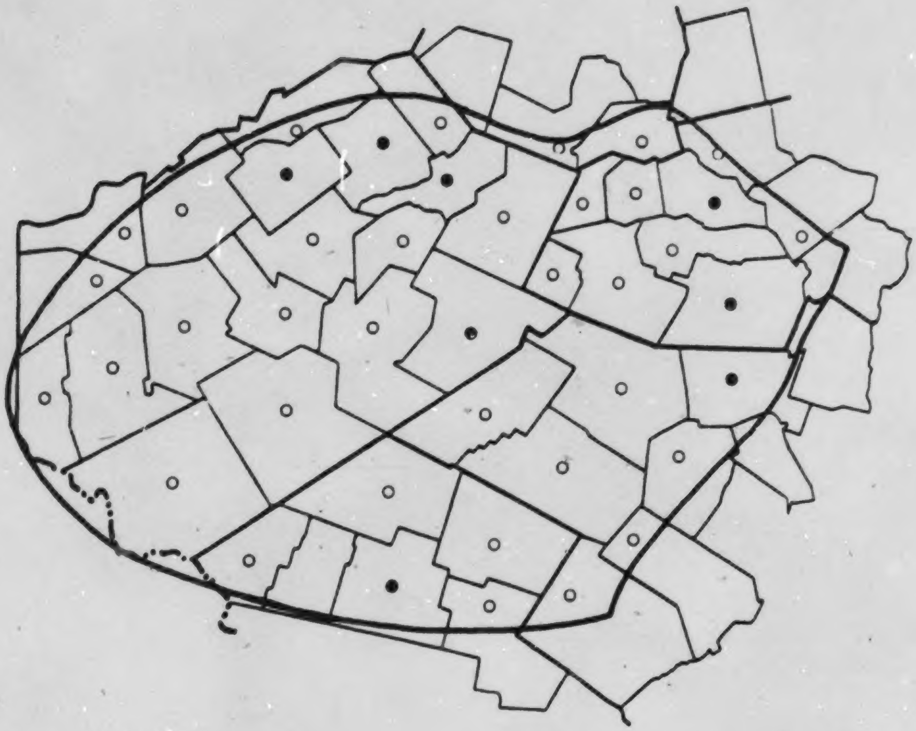
Schoharie County

Vic of W. Conesville, Town of Conesville
   KLB obs 14 Sep 75

Ulster County

Overlook Mt, Town of Woodstock
   KLB & Mary Domville obs 12 Jul 70
Vic of Boiceville, Town of Olive
   KLB obs 23 Jul 74
3 mi nw of Tabasco, Town of Rochester
   KLB & Paul Huth obs 19 Aug 76
2 mi n of Ulster Heights, Town of Warwarsing
   KLB & Paul Huth obs 19 Aug 76

Quercus rubra L.
Northern Red Oak



Delaware County

Franklin, Town of Franklin
M. Platt, 1840
Stamford, Town of Stamford
594 N. Taylor 3-10 Jul 09 at 2300 ft--NY
Arkville, Town of Middletown
P. Wilson 19 Jul 15--NY
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
191 Brooks 27 May 51--NYS; 591 Brooks 23 Jul 51--NYS, Brooks
E of Kilgour Spur, Town of Hancock
SJS obs 17-18 Jun 54
Scotch Mt, 3 1/2 mi ne of Delancey, Town of Delhi
KLB obs 12 Jul 54
1 mi s of W. Harpersfield, Town of Harpersfield
KLB obs 2 Jul 55
Archie Elliott Rd, 4 mi nw of Delhi, Town of Meredith
4976 Brooks 4 Jul 70--NYS

Quercus rubra

Gregorytown, Town of Colchester
   KLB obs 3 Jul 71
Delancey, Town of Hamden
   KLB obs 7 Aug 71
Burroughs Rd, 2 1/2 mi w by n of Roxbury, Town of Roxbury
   KLB obs 20 Aug 72
New Rd, 2 1/2 mi n by w of Bovina, Town of Bovina
   KLB obs 3 Sep 72
6 mi s of Andes, Town of Andes
   KLB obs 12 Jun 73
Vic of N. Franklin, Town of Franklin
   KLB obs 7 Jul 73
Vic of Apex, Town of Tompkins
   KLB obs 8 Jul 73
Emmons Pond, Town of Davenport
   R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]
Vic of Launt Pond, Town of Walton
   KLB obs 28 Jul 74
Vic of Stilesville, Town of Deposit
   KLB obs 10 Aug 75
Vic of Sidney Center, Town of Sidney
   KLB obs 7 Sep 75
3 mi nw of Trout Creek, Town of Masonville
   KLB obs 7 Sep 75

Greene County

Onteora Mt, Town of Hunter
   Anna M. Vail 14 Jul 1892 at 2500 ft--NY
Mt Pisgah, Town of Windham
   1066 N. Taylor 3 Aug 09 at 2900 ft--NY
Windham, Town of Windham
   1134 N. Taylor 6 Aug 09 at 1700 ft--NY
Kaaterskill Gorge, e [w?] of Palenville, Town of Cairo
   SJS obs 28 May 52
Plattkill Mt, Town of Hunter
   Kudish (1971), p. 139
1 1/2 mi e of Lexington, Town of Lexington
   KLB obs 19 Jun 73
[illegible]rattsville, Town of Prattsville
   KLB obs 19 Jun 73
3 mi e of Jewett Center, Town of Jewett
   KLB obs 10 Sep 74
Elk Creek Rd, 2 mi ne of Halcott Center, Town of Halcott
   KLB obs 18 Jun 75
Vic of E. Ashland, Town of Ashland
   KLB obs 4 Jul 75
Vic of Durso Corner, Town of Durham
   KLB obs 26 Sep 75

Quercus rubra

Schoharie County

Vic of Manorkill, Town of Conesville
KLB obs 1 Jul 75
Vic of S. Gilboa, Town of Gilboa
KLB obs 22 Sep 75

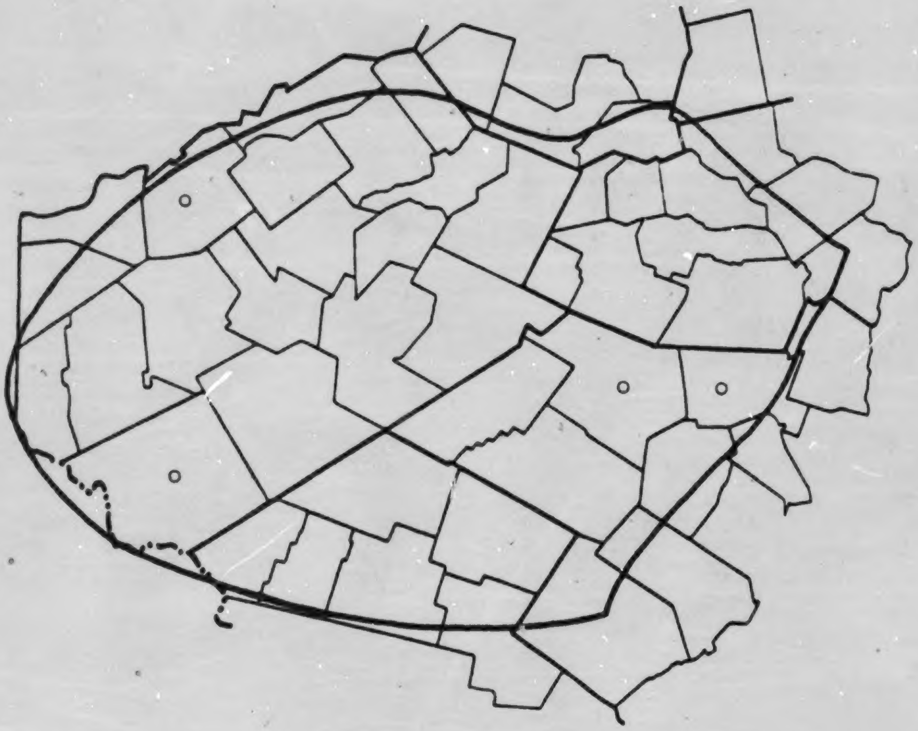
Sullivan County

Vic of Liberty, Town of Liberty
939 E. Whitney 31 May 30--NYS
Dalilia School, near Liberty, Town of Liberty
4657 E. Whitney 31 Jul 35--NYS
Vic of Claryville, Town of Neversink
KLB obs 11 Jun 74
Vic of Lew Beach, Town of Rockland
KLB obs 18 Jun 74
Vic of Hankins, Town of Fremont
KLB obs 19 Jul 76
3 mi n of Woodbourne, Town of Fallsburg
KLB obs 2 Aug 76

Ulster County

Woodland Valley, 4 mi e of Phoenicia, Town of Shandaken
O. P. Medsger in Mem. Torr. Bot. Club 17: 294-300, 1917.
Overlook Mt, Town of Woodstock
4652 H. K. Svenson 26 Aug 31 at 2500 ft--BKL: Kudish (1971), p. 139.
Summit of High Point Mt, Town of Olive
H. Dunbar obs 17 Jun 56: Kudish (1971), p. 139.
Headwaters of Rondout Creek, Town of Denning
SJS obs 5 Sep 58
Mt Tremper, Town of Shandaken
Kudish (1971), p. 139.
1 mi ne of Dry Brook, Town of Hardenburgh
KLB obs 1 Jun 75
3 mi nw of Tabasco, Town of Rochester
KLB & Paul Huth obs 19 Aug 76
2 mi n of Ulster Heights, Town of Warwarsing
KLB & Paul Huth obs 19 Aug 76

Quercus velutina Lam.
Black Oak



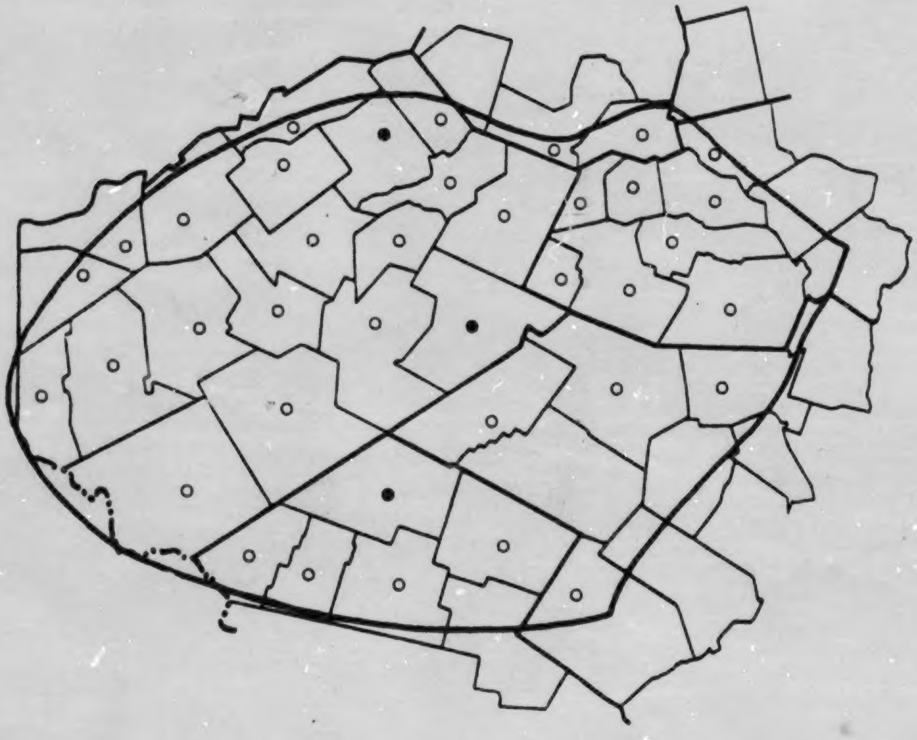
Delaware County

Franklin, Town of Franklin
M. Platt, 1840
E of Kilgour Spur, Town of Hancock
SJS obs 17-18 Jun 54

Ulster County

Woodland Valley, 4 mi e of Phoenicia, Town of Shandaken
O. P. Medsger in Mem. Torr. Bot. Club 17: 294-300, 1917.
Overlook Mt, Town of Woodstock
H. K. Svenson obs 26 Aug 31 in Torreya 31: 156, 1931.

Ulmus americana L.
American Elm



Delaware County

Franklin, Town of Franklin
M. Platt, 1840
Arkville, Town of Middletown
386 N. Taylor 3-4 Jun 09--NY
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
607 Brooks 23 Jul 51--NYS; 617 Brooks 23 Jul 51--NYS, Brooks
Scotch Mt, 3 1/2 mi ne of Delancey, Town of Delhi
KLB obs 12 Jul 54
Hoff Farm, 2 1/4 mi nw of Bovina Center, Town of Bovina
KLB obs 14 Jul 54
1 mi s of W. Harpersfield, Town of Harpersfield
KLB obs 2 Jul 55
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
KLB obs 10 Jul 59
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
4785 Brooks 11 May 68--NYS, Brooks

Ulmus americana

Gregorytown, Town of Colchester
KLB obs 3 Jul 71
Meridale, Town of Meredith
KLB obs 7 Aug 71
Coe Hill Rd, 4 mi sw of W. Davenport, Town of Davenport
KLB obs 7 Aug 71
7 mi nw of Hamden, Town of Hamden
KLB obs 19 Aug 72
Foote Hollow Rd, 2 1/2 mi e of Hobart, Town of Stamford
KLB obs 20 Aug 72
Bigger Hollow Rd, 1 mi w of Andes, Town of Andes
KLB obs 20 Aug 72
2 1/2 mi s of Roxbury on Rt 30, Town of Roxbury
KLB obs 3 Sep 72
Vic of Harvard, Town of Hancock
KLB obs 8 Jul 73
Vic of Beerston, Town of Walton
KLB obs 8 Jul 73
7 mi e by n of Deposit, Town of Tompkins
KLB obs 10 Aug 75
3 mi nw of Trout Creek, Town of Masonville
KLB obs 7 Sep 75
Rt 8, 6 mi ne of Deposit, Town of Deposit
KLB obs 7 Sep 75
Vic of Sidney Center, Town of Sidney
KLB obs 6 Jul 76

Greene County

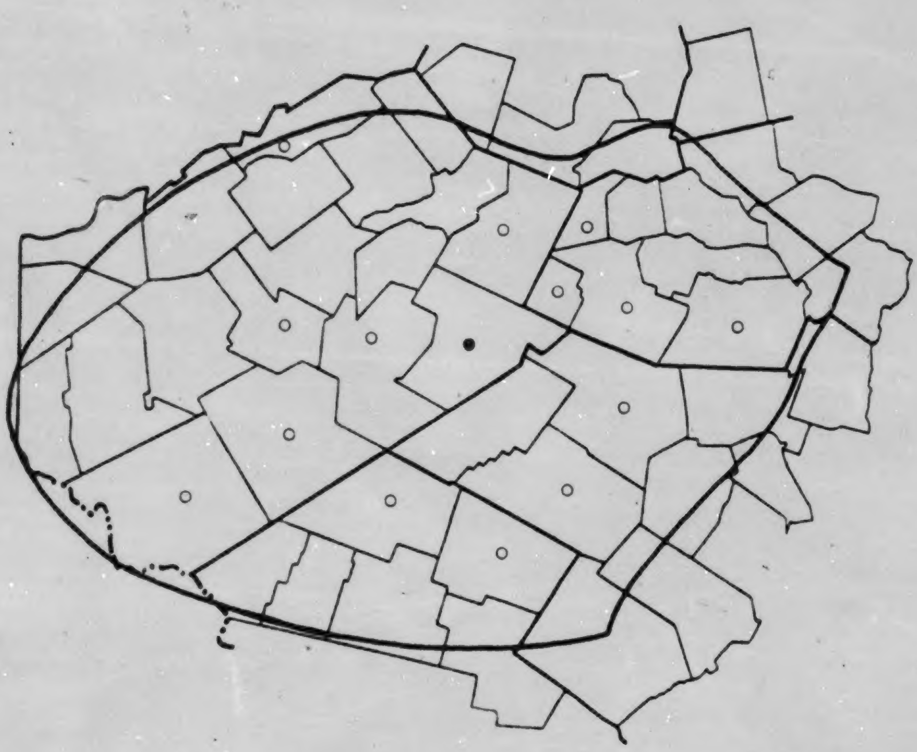
Deep Notch, vic of West Kill, Town of Lexington
SJS obs 15 Jun 56
Stony Clove, Town of Hunter
SJS obs 1 Sep 72
Vic of Prattsville, Town of Prattsville
KLB obs 4 Jul 74
3 mi n of Halcott Center, Town of Halcott
KLB obs 31 May 75
2 mi s of Jewett, Town of Jewett
KLB obs 1 Jul 75
2 mi sw of Ashland, Town of Ashland
KLB obs 1 Jul 75
Vic of Windham, Town of Windham
KLB obs 21 Jul 75
Vic of Durso Corner, Town of Durham
KLB obs 23 Sep 75

Schoharie County

1 mi sw of Gilbia, Town of Gilboa
KLB obs 1 Jul 75

(Continued on p. 313)

Ulmus rubra Muhl.
Slippery Elm



Delaware County

Kilgour Spur, Town of Hancock
SJS obs 10 Aug 55
Margaretville, Town of Middletown
4698 Brooks & Smith 9 Sep 61--NYS
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
4786 Brooks 11 May 68--NYS, Brooks
Dingle Hill Rd, 3 mi s of Andes, Town of Andes
KLB obs 17 Jun 73
3 mi s of Grand Gorge, Town of Roxbury
KLB obs 17 Sep 73
6 mi e by s of Downsville, Town of Colchester
KLB obs 11 Oct 73
2 mi e by s of Davenport Center, Town of Davenport
KLB obs 24 Jun 74
W Terry Clove Rd, 3 mi se of Delancey, Town of Hamden
KLB obs 16 Aug 74

Ulmus rubra

Greene County

Prattsville, Town of Prattsville
   KLB obs 19 Jun 73
Vic of Lanesville, Town of Hunter
   KLB obs 18 Jul 73
3 mi e of West Kill, Town of Lexington
   KLB obs 13 Jun 74

Sullivan County

Vic of Claryville, Town of Neversink
   KLB obs 11 Jun 74
Vic of Roscoe, Town of Rockland
   KLB obs 18 Jun 74

Ulster County

Woodland Valley, 4 mi e of Phoenicia, Town of Shandaken
   O. P. Medsger in Mem. Torr. Bot. Club 17: 294-300, 1917.
Headwaters of Rondout Creek, Town of Denning
   SJS obs 5 Sep 58

Ulmus americana (continued from p. 311)

Vic of Manorkill, Town of Conesville
   KLB obs 1 Jul 75

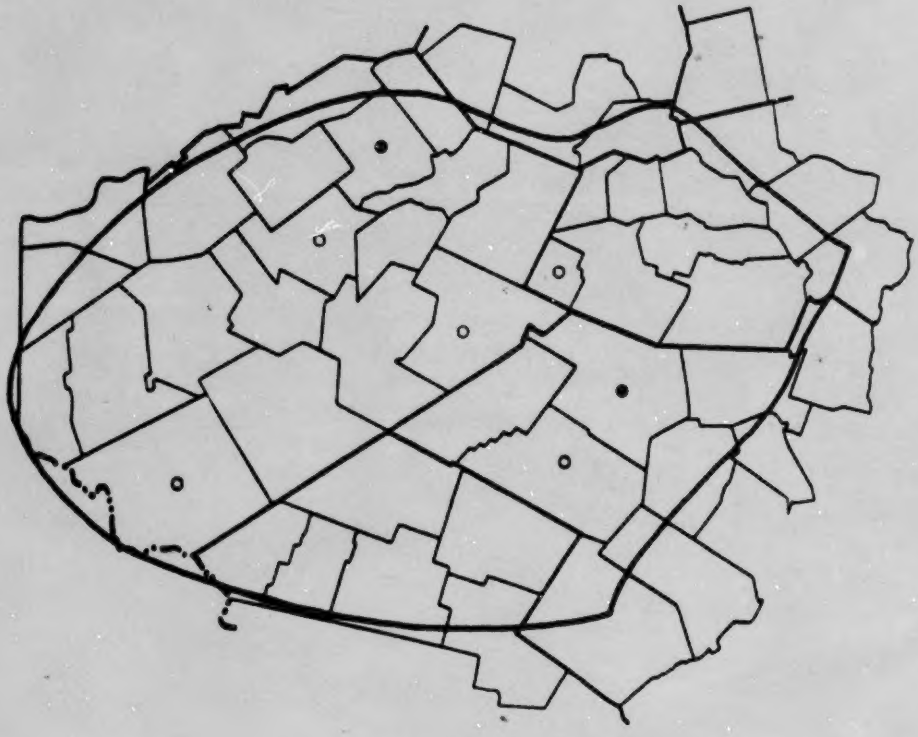
Sullivan County

1 mi sw of Lew Beach, Town of Rockland
   5183 Brooks 3 Jun 74--NYS
Vic of Lakewood, Town of Fremont
   KLB obs 21 Jun 75
4 mi n of Callicoon Center, Town of Callicoon
   KLB obs 21 Jun 75
Vic of Halls Mills, Town of Neversink
   KLB obs 28 Jul 75
Vic of Parksville, Town of Liberty
   KLB obs 28 Jul 75

Ulster County

Woodland Valley, 4 mi e of Phoenicia, Town of Shandaken
   O. P. Medsger in Mem. Torr. Bot. Club 17: 294-300, 1917.
Vic of Willow, Town of Woodstock
   KLB obs 16 May 73
1 mi ne of Dry Brook, Town of Hardenburgh
   KLB obs 8 Jul 75
2 mi n of Ulster Heights, Town of Warwarsing
   KLB & Paul Huth obs 19 Aug 76

Humulus lupulus L.
Hops



Delaware County

Betty's Brook Rd, 4 mi s by w of W. Harpersfield, Town of Kortright
Smith & Brooks obs 19 Jul 52; 3023 Brooks 5 Jul 54--NYS, Brooks
Kilgour Spur, Town of Hancock
SJS obs 10 Aug 55
Fraser, Town of Delhi
KLB obs 29 Aug 70

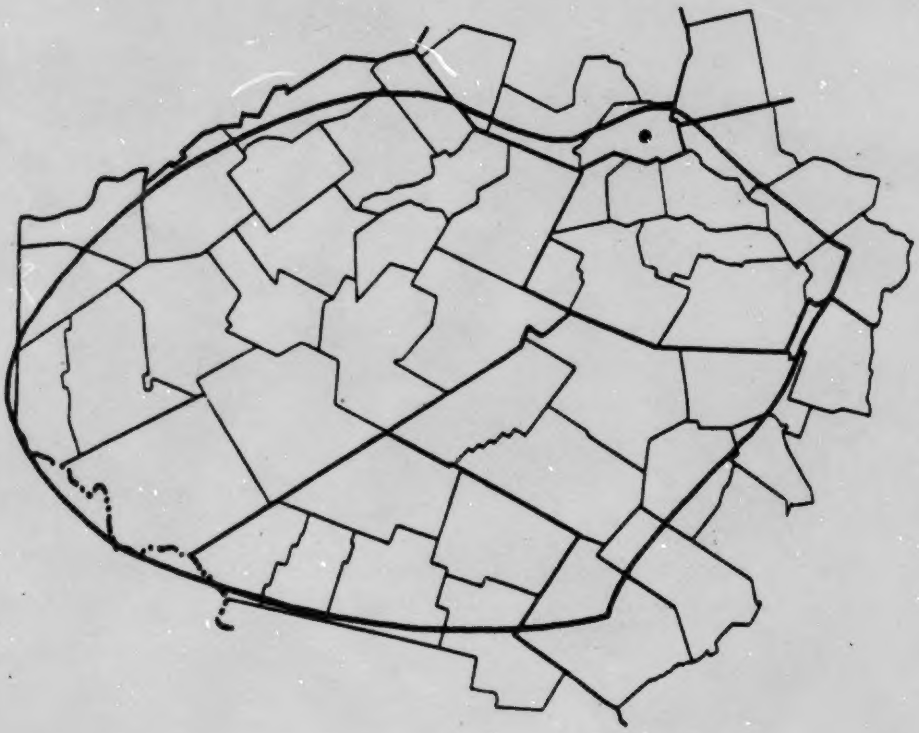
Greene County

Elk Creek Rd, 2 mi ne of Halcott Center, Town of Halcott
KLB obs 18 Jun 75

Ulster County

Vic of Oliverea, Town of Shandaken
N. Taylor 6-9 Sep 18 at 2000-2500 ft--BKL
Vic of Frost Valley Camp, Town of Denning
KLB obs 11 Jun 74

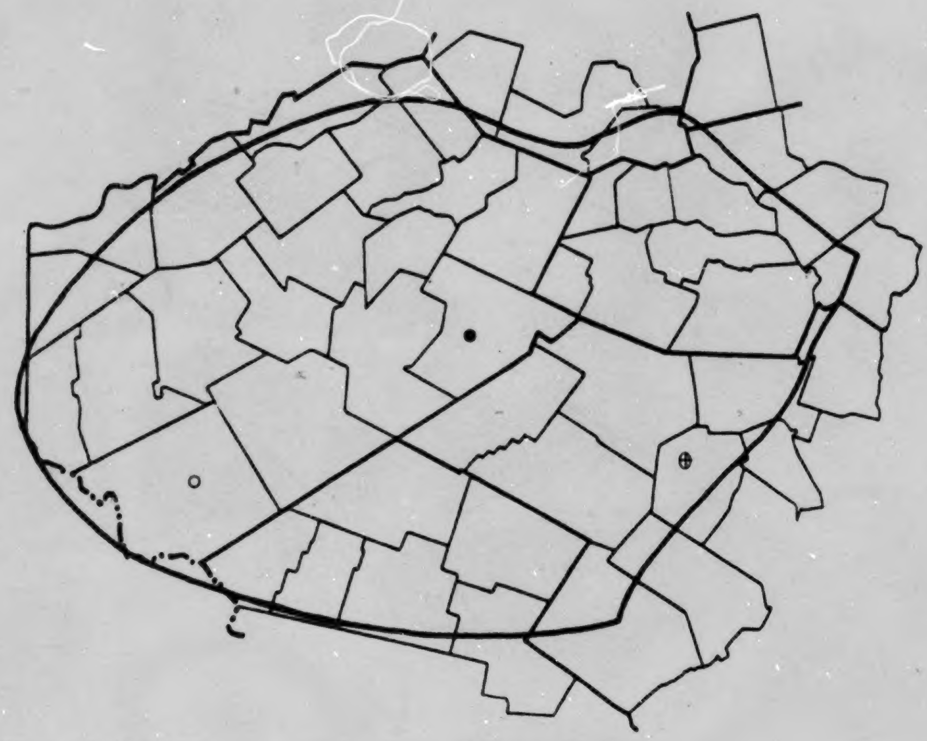
Morus alba L.
White Mulberry



Schoharie County

Vic of W. Conesville, Town of Conesville
6189 Brooks 14 Sep 75--NYS, Brooks

Boehmeria cylindrica (L.) Sw.
False Nettle



Delaware County

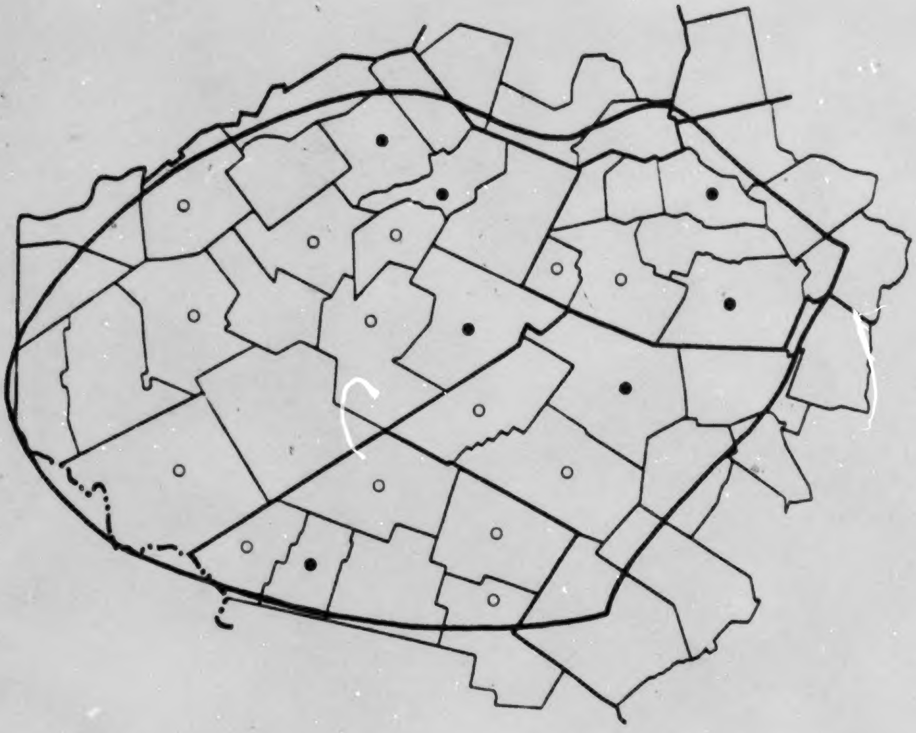
Kilgour Spur, Town of Hancock
SJS obs 10-11 Aug 55
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
4723 Brooks 20 Aug 66--NYS, Brooks

Comandra umbellata (L.) Nutt. Bastard Toadflax (⊕)

Ulster County

Near jct Tongou [Tongore] Rd & Rt 28 [28A], Town of Olive
843 H. Dunbar 26 May 55--NYS
High Point Mt, Town of Olive
966 H. Dunbar 15 Jun 56 at 2500 ft--NYS

Laportea canadensis (L.) Wedd.
Wood Nettle



Delaware County

Franklin, Town of Franklin
M. Platt, 1840
Stamford, Town of Stamford
631 N. Taylor 3-10 Jul 09 at 1900 ft--NY
Arkville, Town of Middletown
P. Wilson 3 Jul 15--NY
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
721 Brooks 27 Jul 51--Brooks
Cameron Farm, 6 mi nw of Andes, Town of Delhi
KLB obs 13-16 Jul 54
Hoff Farm, 2 1/4 mi nw of Bovina Center, Town of Bovina
KLB obs 14 Jul 54
Ne of Kilgour Spur, Town of Hancock
SJS obs 10 Aug 55
Farmers Hill, 3 mi e by s of Andes, Town of Andes
KLB obs 18 Jun 55

Laportea canadensis

Merrill Farm, 2 mi s of Treadwell, Town of Franklin
KLB obs 10 Jul 59
4 mi ne of Walton, Town of Walton
KLB obs 30 May 76

Greene County

Onteora, Town of Hunter
Anna M. Vail 22 Sep 1891--NY
Windham, Town of Windham
870 N. Taylor 28-31 Jul 09 at 1700 ft--NY: 1105 N. Taylor 5 Aug 09 at 1700 ft--NY
Maplecrest, Town of Windham
Alexandra Dodd 10 Jul 27--NY
Steinfeld Place, 3 mi n of Halcott Center, Town of Halcott
KLB obs 26 Jul 75
Deep Notch, 1 mi s of West Kill, Town of Lexington
KLB obs 23 May 76

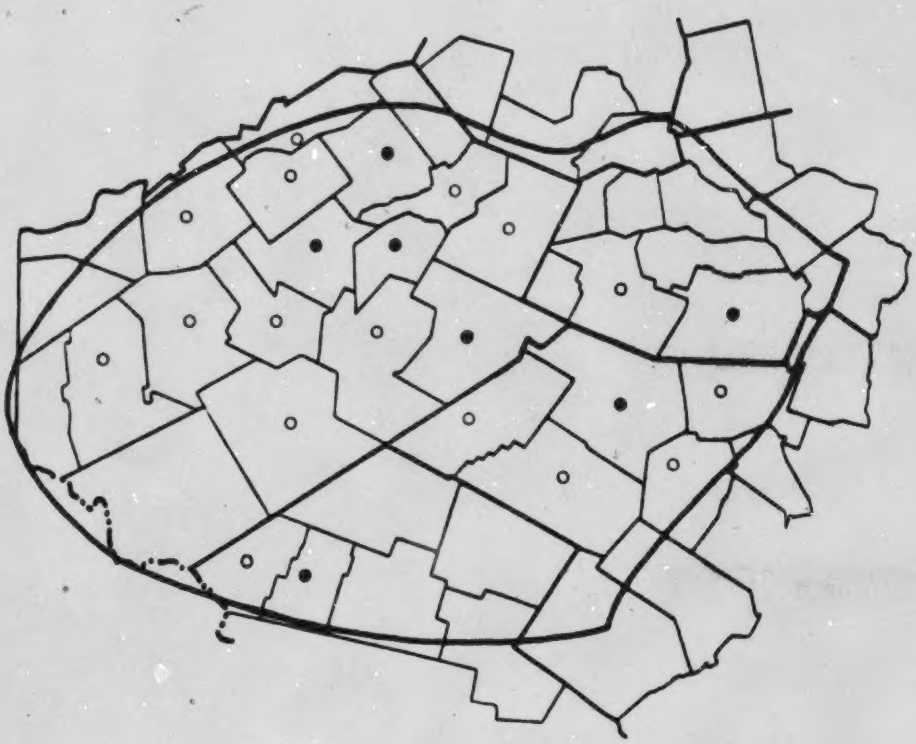
Sullivan County

Vic of L Shandelee, Town of Callicoon
P. Wilson 9 Aug 18--NY
Nw of Willowemoc, Town of Rockland
SJS obs 15 Aug 52
2 1/2 mi s of Claryville, Town of Neversink
KLB obs 10 Jun 75
Vic of Obernburg, Town of Fremont
KLB obs 21 Jun 75
Vic of Loch Sheldrake, Town of Fallsburg
KLB obs 2 Aug 76

Ulster County

Vic of Oliverea, Town of Shandaken
N. Taylor 6-9 Sep 18 at 2000-2500 ft--BKL
Panther Mt, Town of Shandaken
H. M. Denslow 24 Jul 19--NY
Watson Hollow, Town of Denning
SJS obs 15 Aug 57
Trail to Balsam Mt, 6 mi s by e of Arkville, Town of Hardenburgh
KLB obs 18 May 74

Pilea pumila (L.) Gray
Clearweed



Delaware County

Franklin, Town of Franklin
M. Platt, 1840
Bovina, Town of Bovina
D. F. Hoy 12 Sep 1892--MIN
Arkville, Town of Middletown
P. Wilson 21 Jul 15--NY
E of Cameron Farm, 5 1/2 mi nw of Andes, Town of Delhi
1961 Brooks 17 Aug 52--NYS, Brooks
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
2023 Brooks 21 Sep 52--NYS; 4644 Brooks 3 Sep 60--Brooks
Delhi, Town of Delhi
4557 Brooks 5 Sep 59--NYS
4 mi e by s of Corbett, Town of Colchester
KLB obs 30 May 74
Hamden, Town of Hamden
KLB obs 29 Jun 75

Pilea pumila

3 mi e by s of Walton, Town of Walton
   KLB obs 29 Jun 75
Weaver Hollow, 4 mi e of Andes, Town of Andes
   KLB obs 16 Jul 75
E. Meredith, Town of Meredith
   KLB obs 1 Aug 75
Vic of Chamberlain Brook, Town of Tompkins
   KLB obs 31 Aug 75

Greene County

Onteora, Town of Hunter
   Anna M. Vail 3 Oct 1891--NY
2 1/2 mi s of West Kill, Town of Lexington
   KLB obs 27 Jun 75

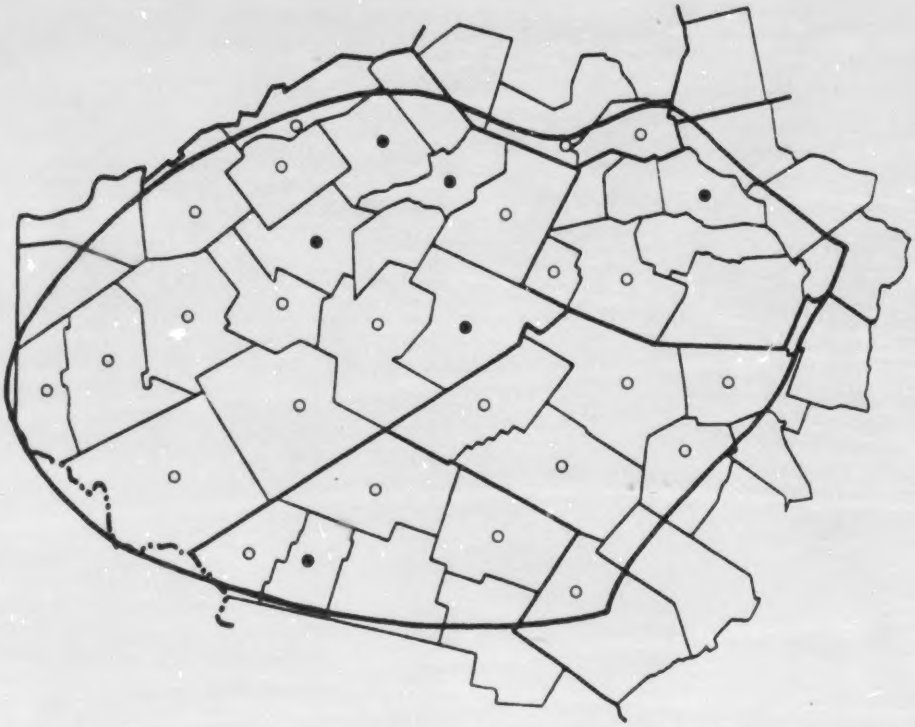
Sullivan County

Vic of L Shandelee, Town of Callicoon
   P. Wilson 23 Aug 18--NY; P. Wilson 27 Aug 18--NY
Vic of Obernburg, Town of Fremont
   KLB obs 21 Jun 75

Ulster County

Vic of Oliverea, Town of Shandaken
   N. Taylor 6-9 Sep 18 at 2000-2500 ft--BKL
Headwaters of Rondout, Town of Denning
   SJS obs 5 Sep 58
Overlook Mt, Town of Woodstock
   Brooks & Mary Domville obs 12 Jul 70
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
   Brooks & Claire Friedberg obs 18 Sep 75
3 mi sw of Dry Brook, Town of Hardenburgh
   KLB obs 17 Jul 76

Urtica dioica L.
   ssp. gracilis (Ait.) Sel.
Stinging Nettle



Delaware County

Franklin, Town of Franklin
   M. Platt, 1840
Stamford, Town of Stamford
   788 N. Taylor 3-10 Jul 09 at 1800 ft--NY
Arkville, Town of Middletown
   P. Wilson 3 Jul 15--NY
Hobart, Town of Stamford
   4450 E. Whitney 25 Jul 35--NYS
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
   606 Brooks 23 Jul 51--NYS, Brooks
Cameron Farm, 6 mi nw of Andes, Town of Delhi
   1904 Brooks 15 Aug 52--NYS
Kilgour Spur, Town of Hancock
   SJS obs 17-18 Jun 54
Davenport Center, Town of Davenport
   Smith & Brooks obs 7 Aug 54

Urtica dioica ssp. gracilis

Margaretville, Town of Middletown
   KLB obs 30 May 55
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
   KLB obs 10 Jul 59
7 1/2 mi s of Andes, Town of Andes
   KLB obs 3 Jul 73
Vic of Stratton Falls, Town of Roxbury
   KLB obs 8 Jul 74
1 1/2 mi w of Meridale, Town of Meredith
   KLB obs 14 Jul 74
Vic of Hawleys, Town of Hamden
   KLB obs 28 Jul 74
2 1/2 mi nw of Downsville, Town of Colchester
   KLB obs 28 Jul 74
3 mi s of Walton, Town of Walton
   KLB obs 29 Jun 75
6 mi ne of Hambleville, Town of Deposit
   KLB obs 6 Jul 76

Greene County

Windham, Town of Windham
   918 N. Taylor 28-31 Jul 09 at 1700 ft--NY
Elk Creek Rd, 2 mi ne of Halcott Center, Town of Halcott
   KLB obs 24 Jul 73
West Kill brook, 4 mi e of West Kill, Town of Lexington
   KLB obs 13 Sep 73

Schoharie County

Vic of Manorkill, Town of Conesville
   KLB obs 1 Jul 75
Vic of S. Gilboa, Town of Gilboa
   KLB obs 22 Sep 75

Sullivan County

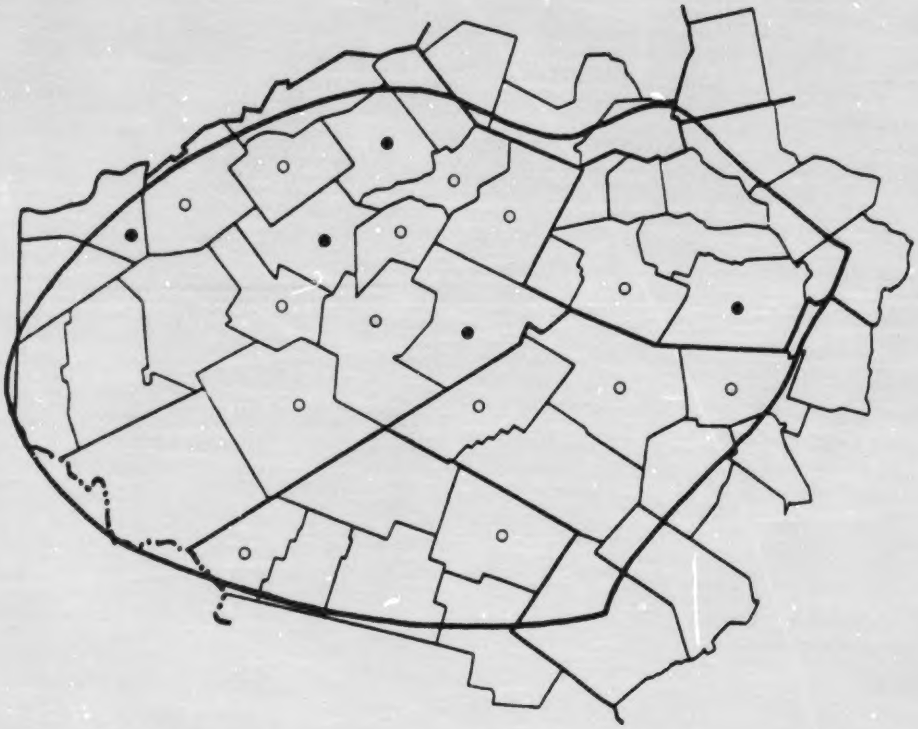
Vic of L Shandelee, Town of Callicoon
   P. Wilson 27 Aug 18--NY
Beaverkill Campsite, Town of Rockland
   KLB obs 3 Jun 74
Vic of Grahamsville, Town of Neversink
   KLB & Paul Huth obs 19 Aug 76

Ulster County

Catskill mts of Ulster County
   Peck [n.d.]--NYS
Overlook Mt, Town of Woodstock
   KLB & Mary Domville obs 12 Jul 70

(Continued on p. 324)

Asarum canadense L.
Wild Ginger



Delaware County

Franklin, Town of Franklin
  M. Platt, 1840
Arkville, Town of Middletown
  F. A. Mulford & P. Wilson 29-31 May 15--NY
Delhi, Town of Delhi
  2023 N. Hotchkiss 9 May 27--NYS
E of Sidney, Town of Sidney
  5076 E. Whitney 19 Jun 36--NYS
Gregorytown, Town of Colchester
  2 Brooks 39--Frag; specimen destroyed after verification by SJS
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
  1223 Brooks 3 May 52--NYS, Brooks
Mt Utsayantha, 1 1/2 mi e by s of Stamford, Town of Stamford
  KLB obs 3 Jul 54
Farmers Hill, 3 mi e by s of Andes, Town of Andes
  KLB obs 18 Jun 55

Asarum canadense

3 mi s of Grand Gorge, Town of Roxbury
   KLB obs 17 Sep 73
3 1/3 mi n by e of Bovina Center, Town of Bovina
   KLB obs 16 May 74
Basin Clove Rd, 1 1/2 mi s by e of Delancey, Town of Hamden
   KLB obs 11 May 75

Greene County

Onteora, Town of Hunter
   Anna M. Vail 6 Oct 1891--NY
Haines Falls, Town of Hunter
   W. C. Ferguson 28 Jun 19--NY
Deep Notch, 1 mi s of West Kill, Town of Lexington
   KLB obs 23 May 76

Sullivan County

Ne of Long Eddy, Town of Fremont
   SJS obs 20-22 Jun 56
S side of Rondout Reservoir, Town of Neversink
   SJS obs 20-22 Jun 56

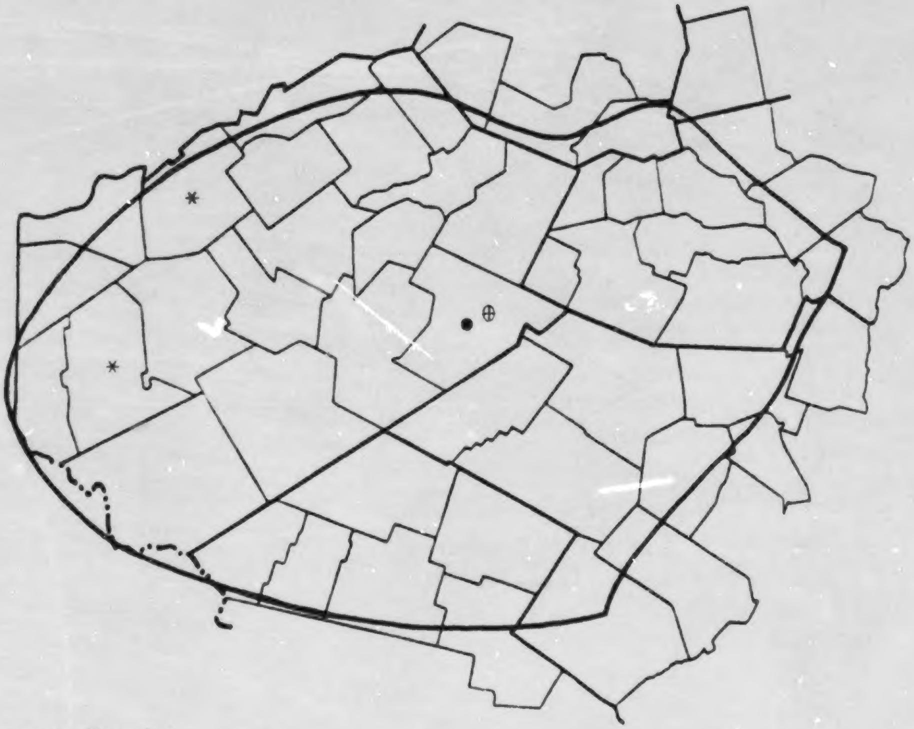
Ulster County

Woodland [Valley], 4 mi e of Phoenicia, Town of Shandaken
   N. L. Britton 30 May-1 Jun 01--NY
Overlook Mt, Town of Woodstock
   KLB & Mary Domville obs 12 Jul 70

Urtica dioica gracilis (continued from p. 322)

5 1/2 mi se of Margaretville, Town of Hardenburgh
   KLB obs 4 Sep 72
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
   KLB & Claire Friedberg obs 18 Jul 73
1 1/2 mi se of Pine Hill, Town of Shandaken
   KLB obs 21 Jul 74
Vic of Bull Run, Town of Denning
   KLB obs 10 Jun 75
2 mi n of Ulster Heights, Town of Warwarsing
   KLB & Paul Huth obs 19 Aug 76

Fagopyrum sagittatum Gilib.
Buckwheat



Delaware County

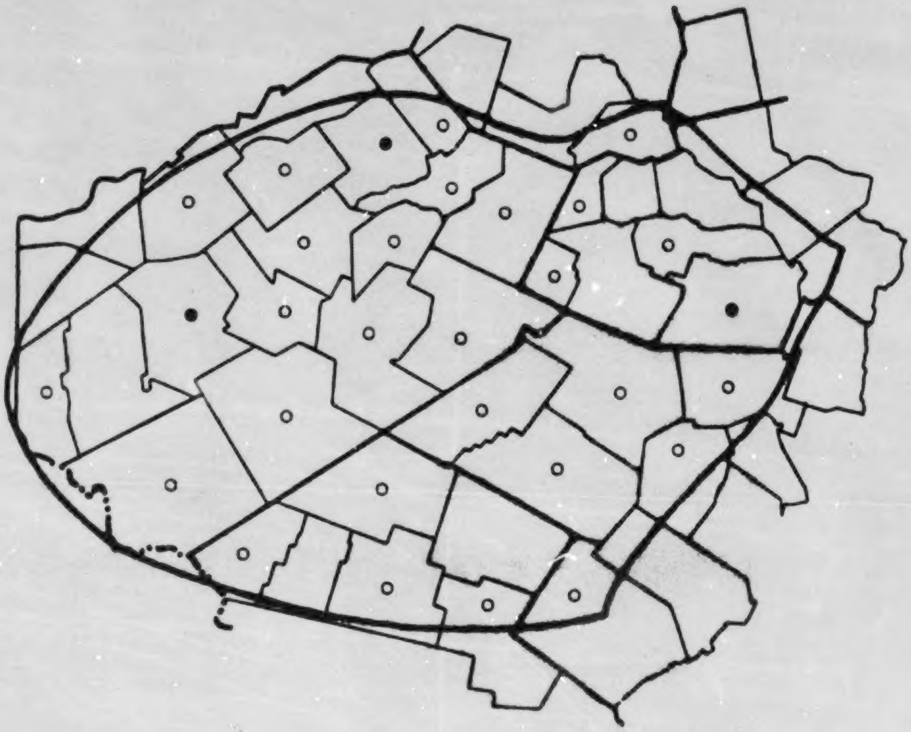
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
6026 Brooks 12 Jul 74--NYS, Brooks

Polygonum arifolium L. var. pubescens (Keller) Fern. Halberd-leaved Tearthumb (⊕, *)

Delaware County

Franklin, Town of Franklin
M. Platt, 1840
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
4770 Brooks 23 Sep 67--NYS, Brooks

Polygonum arenastrum Bor.
Mat-forming Knotweed



Delaware County

Franklin, Town of Franklin
M. Platt, 1840
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
922 Brooks 22 Sep 51--Brooks; 938 Brooks 22 Sep 51--NYS; 2021 Brooks 21 Sep 52--NYS, Brooks
Hancock, Town of Hancock
SJS obs 17 Jun 54
Hoff Farm, 2 1/4 mi nw of Bovina Center, Town of Bovina
KLB obs 14 Jul 54
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
KLB obs 10 Jul 59
Delhi, Town of Delhi
KLB obs 5 Sep 59
Delancey, Town of Hamden
KLB obs 7 Aug 71
6 mi e by n of Downsville, Town of Colchester
KLB obs 16 Jul 73

Polygonum arenastrum

Hobart, Town of Stamford
    KLB obs 30 Jul 73
Grand Gorge, Town of Roxbury
    KLB obs 30 Jul 73
Strauss Farm, 4 1/2 mi ne of Walton, Town of Walton
    6062 Brooks 26 Aug 74--NYS
Margaretville, Town of Middletown
    KLB obs 30 Jun 75
2 mi s of E. Meredith, Town of Meredith
    KLB obs 1 Aug 75
Vic of Stilesville, Town of Deposit
    KLB obs 10 Aug 75
3 1/2 mi s of Andes, Town of Andes
    KLB obs 24 Jul 76
Vic of Harpersfield Center, Town of Harpersfield
    KLB obs 4 Sep 76
3/4 mi s by w of Davenport Center, Town of Davenport
    KLB obs 5 Sep 78

Greene County

Onteora, Town of Hunter
    Anna M. Vail 5 Oct 1891 as P. neglectum--NY
Stony Clove, Town of Hunter
    43835 S. J. Smith et al. 12 Oct 68--NYS
Prattsville, Town of Prattsville
    KLB obs 19 Jun 73
Elk Creek Rd, 2 mi ne of Halcott Center, Town of Halcott
    KLB obs 24 Jul 73
2 mi s of Jewett, Town of Jewett
    KLB obs 1 Jul 75

Schoharie County

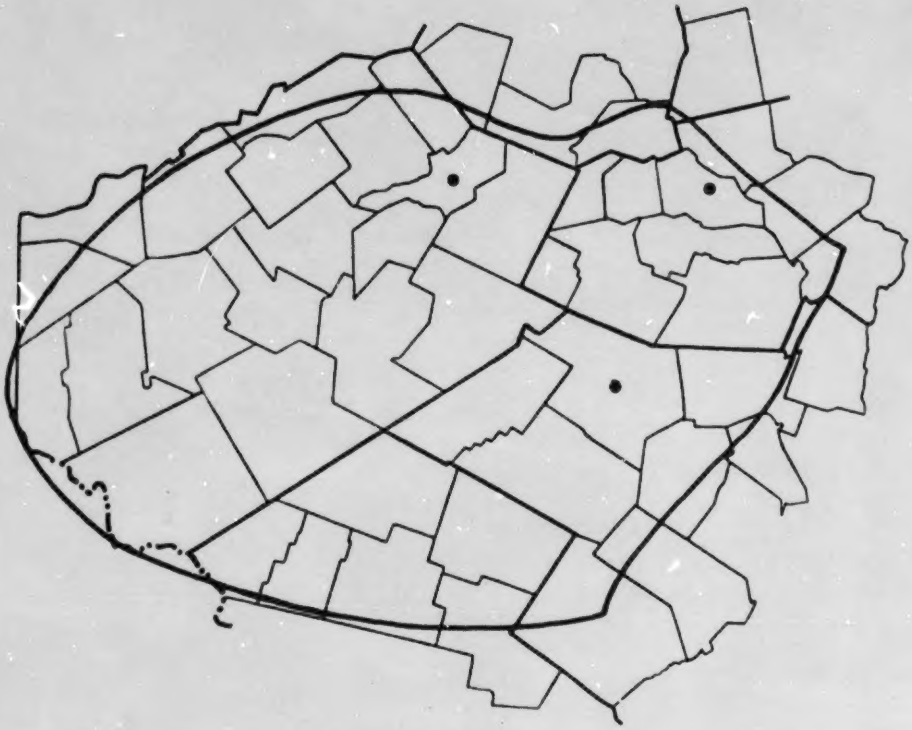
Vic of W. Conesville, Town of Conesville
    KLB obs 17 Aug 76

Sullivan County

Hankins, Town of Fremont
    SJS obs 7 Sep 56
Vic of Roscoe, Town of Rockland
    KLB obs 4 Aug 74
Vic of Parksville, Town of Liberty
    KLB obs 28 Jul 75
Vic of Loch Sheldrake, Town of Fallsburg
    KLB obs 2 Aug 76

(Continued on p. 332)

Polygonum aviculare L.
Upright Knotweed



Delaware County

Vic of Stamford, Town of Stamford
F. Wilkins 1919--NY

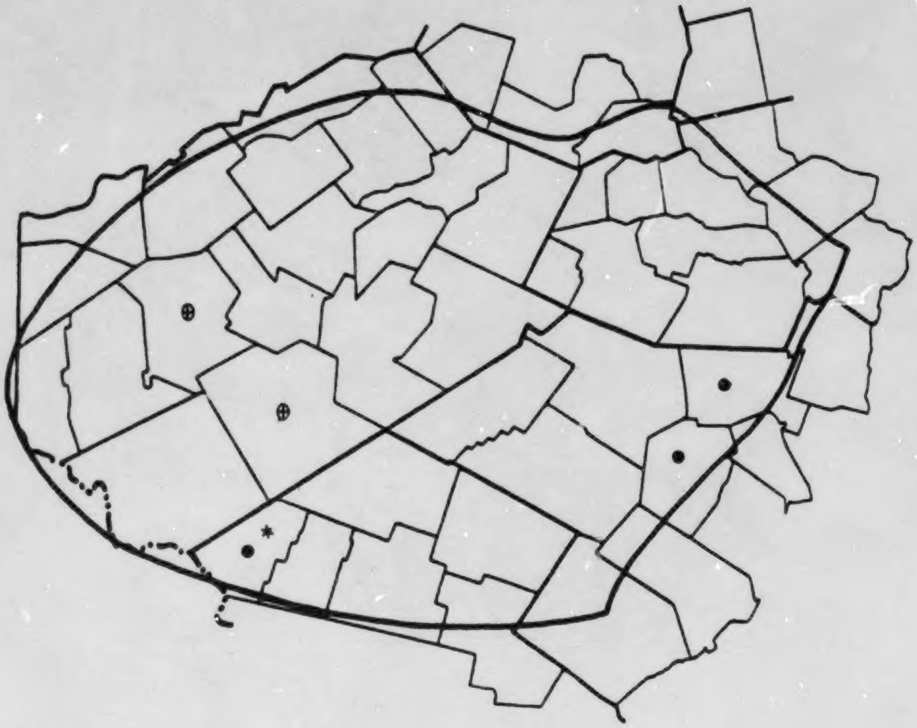
Greene County

Windham, Town of Windham
1143 N. Taylor 6 Aug 09 at 1700 ft--NY
Big Hollow [Maplecrest], Town of Windham
6211 H. K. Svenson 29 Aug 34 at 2000 ft--BKL

Ulster County

1 mi s of Pine Hill, Town of Shandaken
5099 Brooks 17 Sep 72--NYS

Polygonum cespitosum Blume
var. longisetum (DeBruyn) Stewart
Long-bristled Smartweed



Ulster County

Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
830 M. Domville 27 Aug 70--Domville
Vic of Boiceville, Town of Olive
6185 Brooks 11 Sep 75--NYS

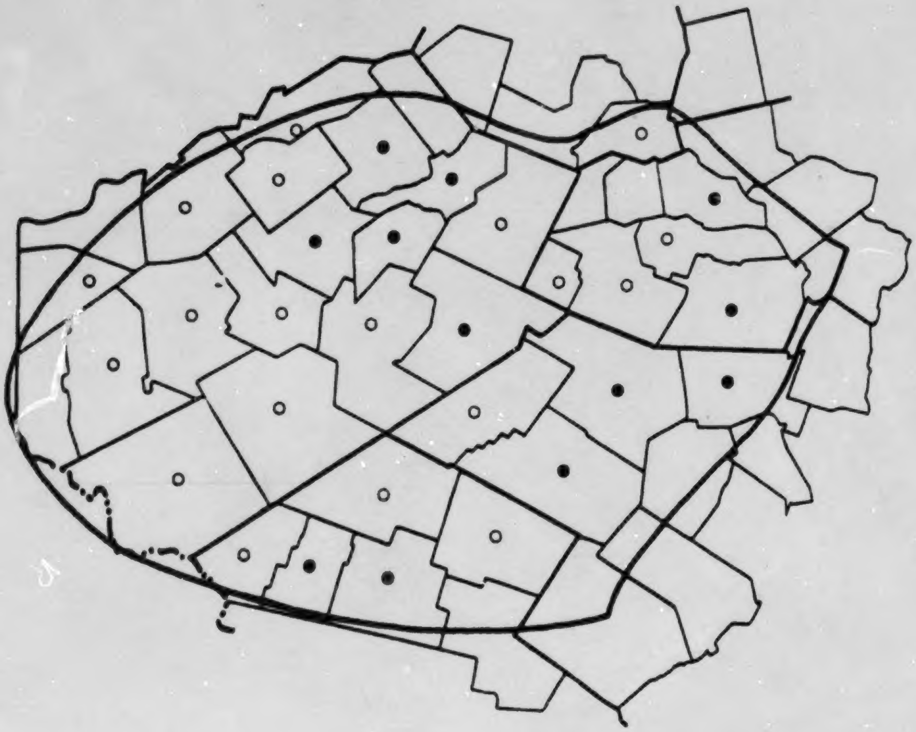
Polygonum nepalense Meisn. Asiatic Smartweed (⊕), *

Delaware County

1 1/2 mi se of Colchester, Town of Walton
6039 Brooks 28 Jul 74--NYS, Brooks
Vic of Shinhopple, Town of Colchester
6171 Brooks 30 Jul 75--NYS
Vic of Pinesville, 2 mi sw of Walton, Town of Walton
KLB obs 31 Aug 75

Polygonum cilinode Michx.
Fringed Bindweed

Flora of
THE CATSKILLS
New York State



Delaware County

Bovina, Town of Bovina
D. F. Hoy Jul 1892--MIN
Arkville, Town of Middletown
383 N. Taylor 3-4 Jun 09 at 1400 ft--NY; P. Wilson 7 Jul 15--NY
1 mi e of Delhi, Town of Delhi
W. C. Muenscher 25 Jul 25--US
Se of Stamford, Town of Stamford
4420 E. Whitney 25 Jul 35--NYS
Cameron Farm, 6 mi nw of Andes, Town of Delhi
332 Brooks 25 Jun 51--NYS
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
719 Brooks 27 Jul 51--NYS; 3045 Brooks 6 Jul 54--NYS, Brooks
Davenport Center, Town of Davenport
SJS obs 17 May 54
1 mi w of Cadosia, Town of Hancock
SJS obs 17-18 Jun 54

Polygonum cilinode

Mt Utsayantha, 1 1/2 mi e by s of Stamford, Town of Stamford
2972 Brooks 3 Jul 54--NYS
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
KLB obs 10 Jul 59
Gregorytown, Town of Colchester
KLB obs 3 Jul 71
Dingle Hill Rd, 3 mi s of Andes, Town of Andes
KLB obs 17 Jun 73
Vic of Launt Pond, Town of Walton
KLB obs 28 Jul 74
1 1/2 mi e of Delancey, Town of Hamden
KLB obs 15 Jun 75
Vic of Apex, Town of Tompkins
KLB obs 27 Aug 75
2 mi n of Trout Creek, Town of Masonville
KLB obs 7 Sep 75
Vic of West Settlement, Town of Roxbury
KLB obs 27 Jun 76

Greene County

High Peak, vic of Windham, Town of Windham
W. H. Leggett Aug 1872--NY
Onteora, Town of Hunter
Anna M. Vail 21 Jun 1891--NY
Kaaterskill, Town of Hunter
Gershoy 8 Jun 18--CU
N slope of Hunter Mt, Town of Hunter
4575 H. K. Svenson 24 Aug 31 at 3000 ft--BKL
Elk Creek Rd, 2 mi ne of Halcott Center, Town of Halcott
KLB obs 24 Jul 73
2 1/2 mi s of West Kill, Town of Lexington
KLB obs 27 Jun 75
2 mi s of Jewett, Town of Jewett
KLB obs 1 Jul 75

Schoharie County

Vic of W. Conesville, Town of Conesville
KLB obs 8 Jun 76

Sullivan County

Vic of L Shandelee, Town of Callicoon
P. Wilson 3 Aug 18 & 18 Aug 18--NY
N of Liberty, Town of Liberty
6789 Smith & Boscom 15 Jun 50--NYS
Vic of Willowemoc, Town of Neversink
SJS obs 15 Aug 52
Vic of Obernburg, Town of Fremont
SJS obs 7 Sep 56

Polygonum cilinode

1 mi s of Lew Beach, Town of Rockland
   KLB obs 3 Jun 74

Ulster County

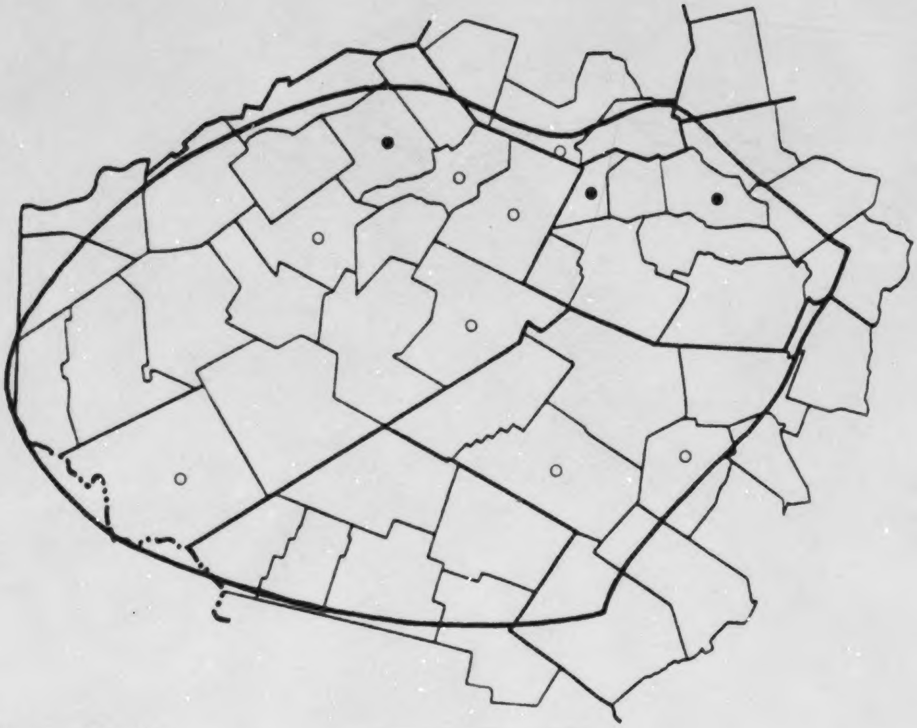
Denning, Town of Denning
   Peck Aug [n.d.]--NYS
Lake Hill, Town of Woodstock
   E. G. Knight 31 Aug 1877--NY
Highmount, Town of Shandaken
   173A M. Domville 2 Aug 66--Domville
Trail to Balsam Mt, 6 mi s by e of Arkville, Town of Hardenburgh
   Kudish (1971), p. 128; KLB obs 18 May 74
2 mi n of Ulster Heights, Town of Warwarsing
   KLB & Paul Huth obs 19 Aug 76

Polygonum arenastrum (continued from p. 327)

Ulster County

Vic of Phoenicia, Town of Shandaken
   KLB obs 20 Sep 72
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
   KLB & Claire Friedberg obs 18 Jul 73
Vic of Belle Ayre village, Town of Hardenburgh
   KLB obs 8 Jul 75
Vic of Willow, Town of Woodstock
   KLB obs 28 Jul 76
Vic of Frost Valley Camp, Town of Denning
   KLB obs 2 Aug 76
2 mi n of Ulster Heights, Town of Warwarsing
   KLB & Paul Huth obs 19 Aug 76

Polygonum convolvulus L.
Black Bindweed

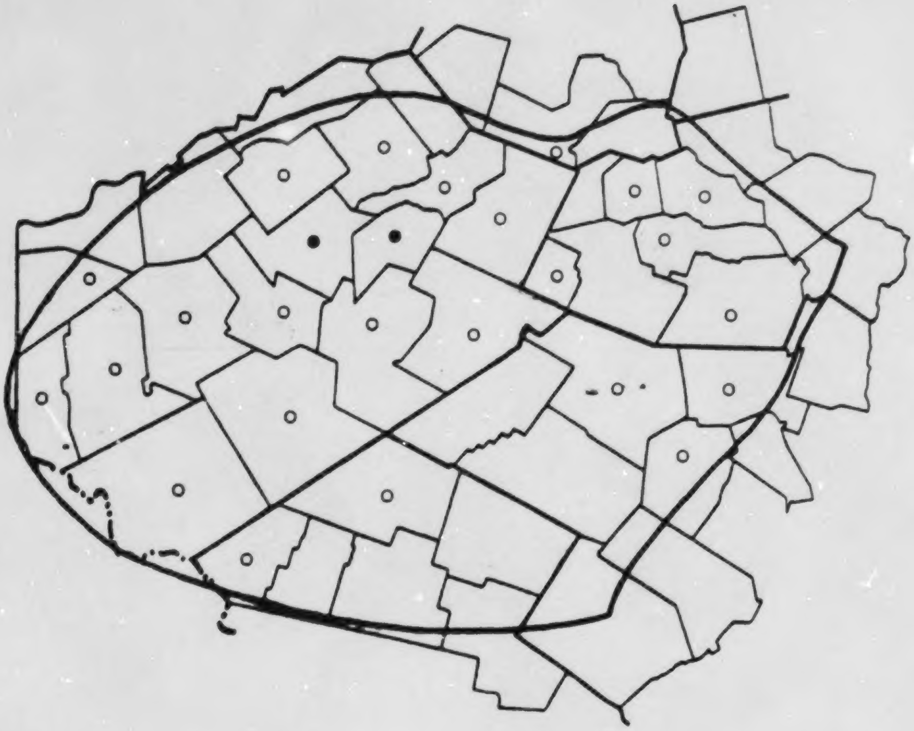


Delaware County

Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
541 Brooks 21 Jul 51--Brooks; 706 Brooks 27 Jul 51--NYS
Hancock, Town of Hancock
SJS obs 17 Jun 54
Margaretville, Town of Middletown
Smith & Brooks obs 9 Sep 61
Fraser, Town of Delhi
KLB obs 4 Jul 70
Hobart, Town of Stamford
KLB obs 30 Jul 73
3 mi sw of Grand Gorge, Town of Roxbury
KLB obs 10 Sep 75
6 mi sw of Walton, Town of Walton
KLB obs 19 Jul 76
3 1/2 mi s of Andes, Town of Andes
KLB obs 24 Jul 76

(Continued on p. 343)

Polygonum cuspidatum Sieb. & Zucc.
Japanese Knotweed



Delaware County

Cameron Farm, 6 mi nw of Andes, Town of Delhi
1453 Brooks 31 May 52--Brooks
Hoff Farm, 2 1/2 mi nw of Bovina Center, Town of Bovina
3111 Brooks 14 Jul 54--NYS
W of Cadosia, Town of Hancock
SJS obs 11 Aug 55
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
T327 Brooks 28 Aug 67
4 mi se of Downsville, Town of Colchester
KLB obs 12 Jun 73
Vic of Meridale, Town of Meredith
KLB obs 7 Jul 73
Vic of Strauss Farm, 4 1/2 mi ne of Walton, Town of Walton
KLB obs 26 Aug 74
2 mi e of Hamden, Town of Hamden
KLB obs 26 Aug 74

Polygonum cuspidatum

Hobart, Town of Stamford
KLB obs 21 May 75
3 mi s of Deposit, Town of Deposit
KLB obs 10 Aug 75
Vic of Andes, Town of Andes
KLB obs 23 Aug 75
3 mi nw of Trout Creek, Town of Masonville
KLB obs 7 Sep 75
2 mi ne of Denver, Town of Roxbury
KLB obs 10 Sep 75
4 mi n of Bloomville, Town of Kortright
KLB obs 4 Jun 76
7 mi ne of Deposit, Town of Tompkins
KLB obs 6 Jul 76

Greene County

3 mi e of Jewett Center, Town of Jewett
KLB obs 10 Sep 74
Vic of Devil's Tombstone Campsite, Town of Hunter
KLB obs 10 Sep 74
2 mi n of Windham, Town of Windham
KLB obs 21 Jul 75
2 mi n of Halcott Center, Town of Halcott
KLB obs 13 Sep 75
Vic of E. Ashland, Town of Ashland
KLB obs 14 Sep 75

Schoharie County

Vic of S. Gilboa, Town of Gilboa
KLB obs 22 Sep 75

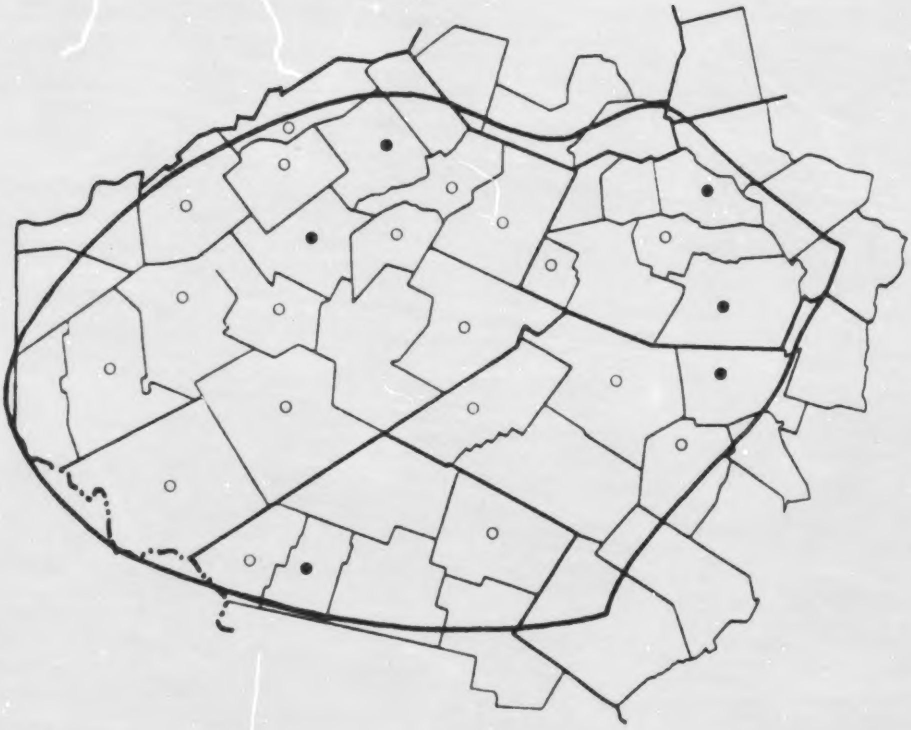
Sullivan County

Vic of Beaverkill Campsite, Town of Rockland
KLB obs 3 Jun 74
Vic of Long Eddy, Town of Fremont
KLB obs 19 Jul 76

Ulster County

Vic of Allaben, Town of Shandaken
KLB obs 4 Sep 74
Vic of Boiceville, Town of Olive
KLB obs 5 Sep 75

Polygonum hydropiper L.
Water Smartweed



Delaware County

Franklin, Town of Franklin
   M. Platt, 1840
Cameron Farm, 6 mi nw of Andes, Town of Delhi
   1882 Brooks 15 Aug 52--NYS, Brooks
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
   3199 Brooks 8 Aug 54--NYS; 3326 Brooks 5 Sep 54--NYS; 3928 Brooks
   5 Sep 55--NYS, Brooks
Kilgour Spur, Town of Hancock
   SJS obs 10-11 Aug 55
Margaretville, Town of Middletown
   Smith & Brooks obs 9 Sep 61
Strauss Farm, 4 1/2 mi ne of Walton, Town of Walton
   KLB obs 26 Aug 74 (specimen checked)
2 mi s of E. Meredith, Town of Meredith
   KLB obs 1 Aug 75
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
   KLB obs 4 Aug 75

Polygonum hydropiper

Vic of Downsville, Town of Colchester
KLB obs 27 Aug 75
Vic of Apex, Town of Tompkins
KLB obs 27 Aug 75
Vic of Delancey, Town of Hamden
KLB obs 7 Sep 75
Walker Farm, 2 mi n of Roxbury, Town of Roxbury
KLB obs 21 Aug 76

Greene County

Onteora swamp, Town of Hunter
Anna M. Vail 20 Sep 1892--NY
Windham, Town of Windham
941 N. Taylor 28-31 Jul 09 at 1700 ft--NY
Stony Clove Pond, Town of Hunter
Muenscher & Curtis 9 Sep 36--CU
Steinfeld Place, 3 mi n of Halcott Center, Town of Halcott
KLB obs 13 Sep 75
Vic of Jewett Center, Town of Jewett
KLB obs 14 Sep 75

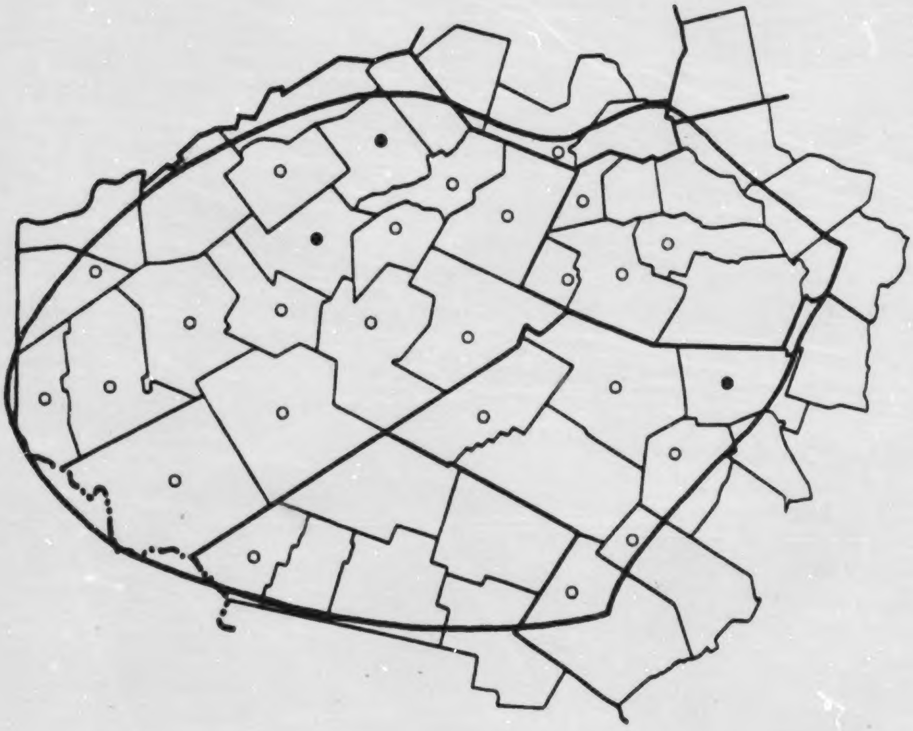
Sullivan County

Vic of L Shandelee, Town of Callicoon
P. Wilson 15 Aug 18--NY
Vic of Willowemoc, Town of Neversink
SJS obs 15 Aug 52

Ulster County

Catskill mts of Ulster County
Peck Jul [n.d.]--NYS
Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
847 M. Domville 9 Sep 70--Domville
Huth Place, 1 1/2 mi s of Pine Hill, Town of Shandaken
KLB & Paul Huth obs 17 Sep 72
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
KLB & Claire Friedberg obs 18 Sep 75

Polygonum pensylvanicum L.
var. laevigatum Fern.
Pinkweed



Delaware County

Bullet Hollow Rd, 4 1/2 mi nw of Andes, Town of Delhi
1947 Brooks 17 Aug 52--NYS, Brooks
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
3325 Brooks 5 Sep 54--Brooks
W of Cadosia, Town of Hancock
SJS obs 11 Aug 55
Ross Farm, 1 mi s of Margaretville, Town of Middletown
T417 & T418 Brooks 22 Jun 69
Andes, Town of Andes
KLB obs 24 Aug 72
3 mi s of Grand Gorge, Town of Roxbury
KLB obs 3 Sep 72
3 mi e of Bloomville on Rt 18, Town of Stamford
KLB obs 3 Sep 72
Vic of Downsville, Town of Colchester
KLB obs 11 Sep 74

Polygonum pensylvanicum var. laevigatum

6 mi n of Bovina Center, Town of Bovina
KLB obs 29 Sep 74
2 mi s of E. Meredith, Town of Meredith
KLB obs 1 Aug 75
Vic of Apex, Town of Tompkins
KLB obs 27 Aug 75
Vic of Walton, Town of Walton
KLB obs 29 Aug 75
Vic of Silver L, Town of Deposit
KLB obs 31 Aug 75
Vic of Delancey, Town of Hamden
KLB obs 7 Sep 75
3 mi nw of Trout Creek, Town of Masonville
KLB obs 7 Sep 75

Greene County

2 mi s of West Kill, Town of Lexington
KLB obs 10 Sep 74
3 mi e of Jewett Center, Town of Jewett
KLB obs 10 Sep 74
Steinfeld Place, 3 mi n of Halcott Center, Town of Halcott
KLB obs 13 Sep 75
Vic of Red Falls, Town of Prattsville
KLB obs 14 Sep 75

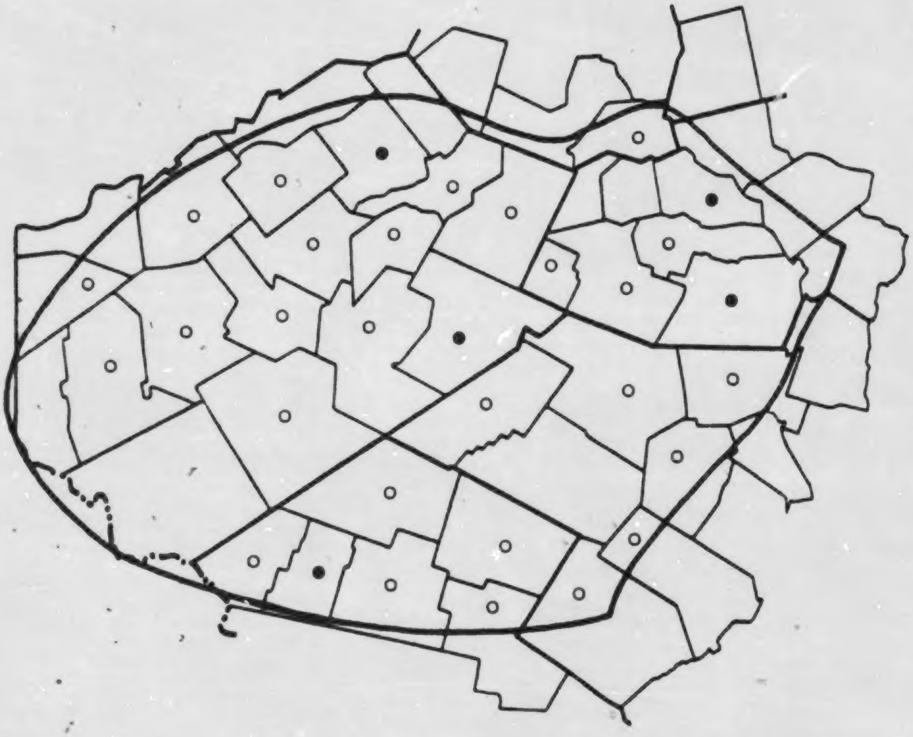
Ulster County

Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
804 M. Domville 20 Aug 70--Domville
5 1/2 mi se of Margaretville, Town of Hardenburgh
KLB obs 4 Sep 72
Huth Place, 1 1/2 mi s of Pine Hill, Town of Shandaken
KLB & Paul Huth obs 17 Sep 72
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
KLB & Claire Friedberg obs 11 Sep 75
3 mi nw of Tabasco, Town of Rochester
KLB & Paul Huth obs 19 Aug 76
2 mi n of Ulster Heights, Town of Warwarsing
KLB & Paul Huth obs 19 Aug 76

Schoharie County

Vic of S. Gilboa, Town of Gilboa
KLB obs 17 Aug 76

Polygonum persicaria L.
Lady's-thumb



Delaware County

Franklin, Town of Franklin
M. Platt, 1840
Arkville, Town of Middletown
P. Wilson 16 Jul 15--NY
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
544 Brooks 21 Jul 51--NYS; 584 Brooks 22 Jul 51--Brooks; 689 Brooks 26 Jul 51--NYS; 951 Brooks 22 Sep 51--NYS; 3929 Brooks 5 Sep 55--NYS
Scotch Mt, 3 1/2 mi ne of Delancey, Town of Delhi
KLB obs 12 Jul 54
Hoff Farm, 2 1/4 mi nw of Bovina Center, Town of Bovina
KLB obs 14 Jul 54
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
KLB obs 10 Jul 59
1 1/2 mi s of Andes, Town of Andes
KLB obs 14 Jul 73
Vic of Grand Gorge, Town of Roxbury
KLB obs 25 Jul 74

Polygonum persicaria

Bush Clove, 4 mi se of Delancey, Town of Hamden
KLB obs 16 Aug 74
Vic of Shinhopple, Town of Colchester
KLB obs 30 Jul 75
4 mi sw of Walton, Town of Walton
KLB obs 10 Aug 75
Vic of Apex, Town of Tompkins
KLB obs 27 Aug 75
Mormon Hollow Rd, 3 mi w of Trout Creek, Town of Masonville
KLB obs 7 Sep 75
Vic of E. Meredith, Town of Meredith
KLB obs 30 Sep 75
Summit of Mt Utsayantha, Town of Stamford
KLB obs 4 Sep 76 at 3200 ft

Greene County

Onteora, Town of Hunter
Anna M. Vail 29 Aug 1891--NY
Mt Pisgah, Town of Windham
1072 N. Taylor 3 Aug 09 at 2900 ft--NY
Elk Creek Rd, 2 mi ne of Halcott Center, Town of Halcott
KLB obs 24 Jul 73
Vic of Beaches Corners, Town of Jewett
KLB obs 4 Jul 75
Deep Notch, 1 mi s of West Kill, Town of Lexington
KLB obs 17 Aug 76

Schoharie County

Vic of W. Conesville, Town of Conesville
KLB obs 17 Aug 76

Sullivan County

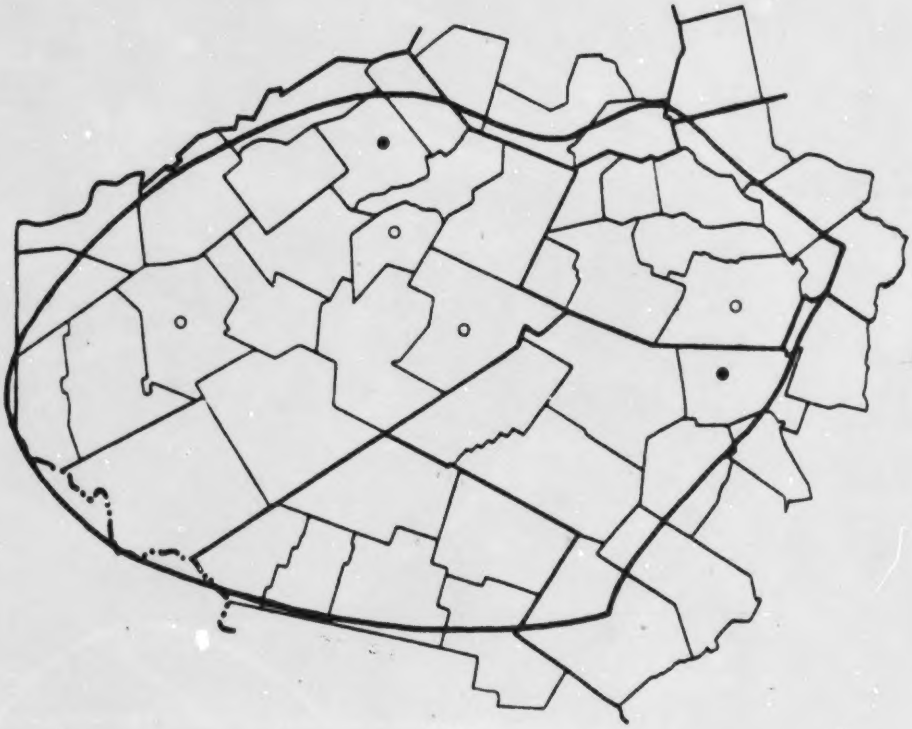
Vic of L Shandelee, Town of Callicoon
P. Wilson 26 Jul 18 & 15 Aug 18--NY
Vic of Amber L, 3 mi ne of Roscoe, Town of Rockland
KLB obs 4 Aug 74
Vic of Liberty, Town of Liberty
KLB obs 28 Jul 75
Vic of Loch Sheldrake, Town of Fallsburg
KLB obs 2 Aug 76
Vic of Grahamsville, Town of Neversink
KLB & Paul Huth obs 19 Aug 76

Ulster County

Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
851 M. Domville 19 Sep 70--Domville

(Continued on p. 343)

Polygonum punctatum Ell.
var. confertiflorum (Meisn.) Fassett
Dotted Water Smartweed



Delaware County

Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
690 Brooks 26 Jul 51--Brooks; 691 Brooks 26 Jul 51--NYS
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
BW9-11 Brooks 2 Oct 71
2 mi n by e of Bovina Center, Town of Bovina
KLB obs 30 Jul 73 (specimen checked)
Vic of Launt Pond, Town of Walton
KLB obs 28 Jul 74 (specimen checked)

Greene County

South Lake, Town of Hunter
SJS obs 7 Sep 57

Polygonum punctatum var. confertiflorum

Ulster County

Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
968 M. Domville 6 Sep 70--Domville

Polygonum convolvulus (continued from p. 333)

Greene County

Mt Pisgah, Town of Windham
1063 N. Taylor 3 Aug 09 at 2900 ft--NY
Vic of Prattsville, Town of Prattsville
6151 Brooks 4 Jul 75--NYS

Schoharie County

Vic of S. Gilboa, Town of Gilboa
KLB obs 17 Aug 76

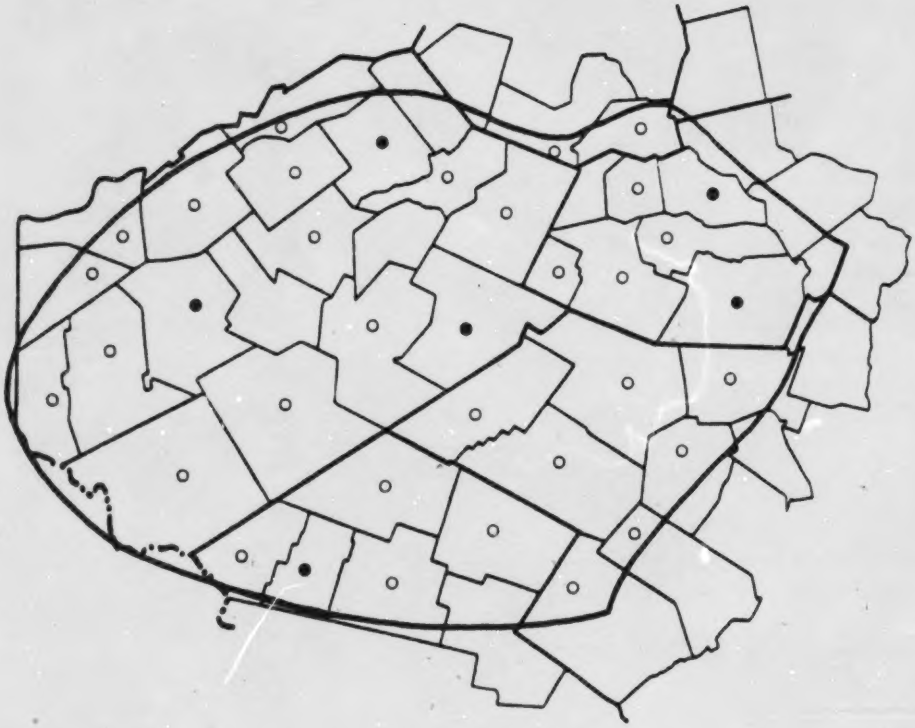
Ulster County

Friedberg Place, 1 mi sw of Boiceville, Town of Olive
KLB & Claire Friedberg obs 11 Sep 75
Vic of Frost Valley Camp, Town of Denning
KLB obs 2 Aug 76

Polygonum persicaria (continued from p. 341)

Pine Hill, Town of Shandaken
KLB obs 24 Jun 73
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
KLB & Claire Friedberg obs 18 Jul 73
Vic of Belle Ayre village, Town of Hardenburgh
KLB obs 8 Jul 75
2 mi n of Ulster Heights, Town of Warwarsing
KLB & Paul Huth obs 19 Aug 76
3 mi nw of Tabasco, Town of Rochester
KLB & Paul Huth obs 19 Aug 76

Polygonum sagittatum
Arrow-leaved Tearthumb



Delaware County

Franklin, Town of Franklin
M. Platt, 1840
Arkville, Town of Middletown
P. Wilson 24 Jul 15--NY
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
451 Brooks 8 Jul 51--NYS; 548 Brooks 21 Jul 51--NYS; 567 Brooks 22 Jul 51--NYS, Brooks
Cameron Farm, 6 mi nw of Andes, Town of Delhi
KLB obs 13-16 Jul 54
W of Cadosia, Town of Hancock
SJS obs 10-11 Sep 55
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
KLB obs 10 Jul 59
Pines Brook, vic of Walton, Town of Walton
A. E. Jenkins & Taylor 26 Jul 59--NYS
Grand Gorge, Town of Roxbury
SJS obs 9 Sep 61

Polygonum sagittatum

Margaretville, Town of Middletown
Smith & Brooks obs 9 Sep 61
Barkaboom Rd, 9 mi s by e of Andes, Town of Andes
KLB obs 23 Jul 73
Vic of Downsville, Town of Colchester
KLB obs 11 Sep 74
Township Rd, 2 mi e of Hobart, Town of Stamford
KLB obs 14 Aug 75
Vic of Apex, Town of Tompkins
KLB obs 27 Aug 75
Vic of Silver L, Town of Deposit
KLB obs 31 Aug 75
3 mi nw of Trout Creek, Town of Masonville
KLB obs 7 Sep 75
Vic of Sidney Center, Town of Sidney
KLB obs 7 Sep 75
1/2 mi s of Davenport, Town of Davenport
KLB obs 30 Sep 75
Vic of Spring L, Town of Meredith
KLB obs 19 Sep 76

Greene County

Onteora, Town of Hunter
Anna M. Vail 20 Jul 1891 & 20 Sep 1892--NY
Windham, Town of Windham
1043 N. Taylor 2 Aug 09 at 1700 ft--NY; 1107 N. Taylor 5 Aug 09 at 1700 ft--NY
Round Top, Town of Hunter
Gershoy 18 Jun 18--CU
West Kill brook, 4 mi e of West Kill, Town of Lexington
KLB obs 13 Sep 73
3 mi e of Jewett Center, Town of Jewett
KLB obs 10 Sep 74
Steinfeld Place, 3 mi n of Halcott Center, Town of Halcott
KLB obs 26 Jul 75
Vic of Ashland, Town of Ashland
KLB obs 14 Sep 75

Schoharie County

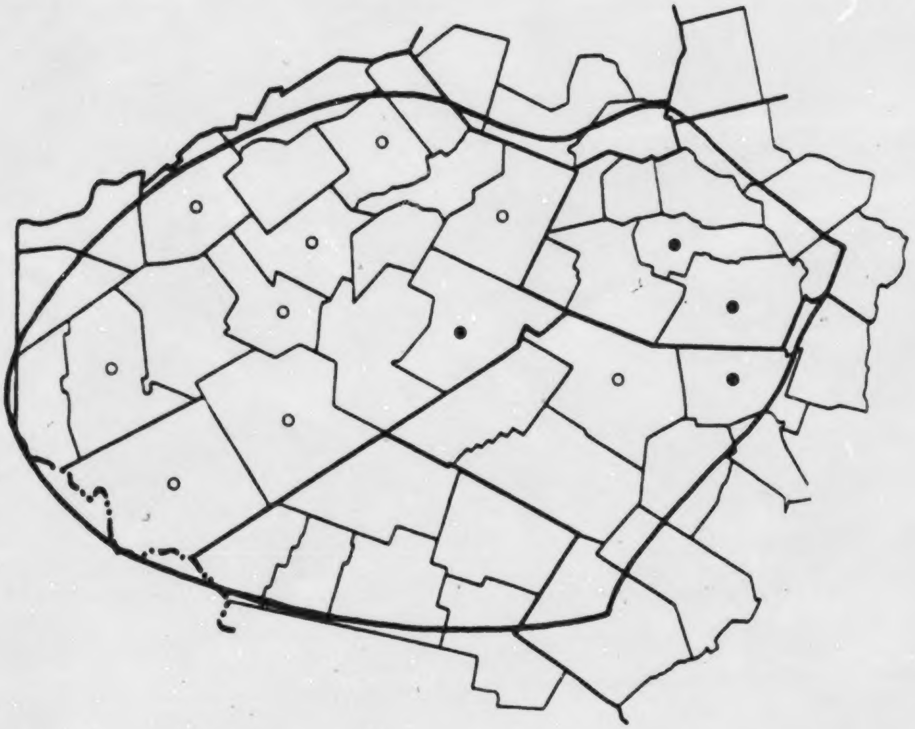
Vic of W. Conesville, Town of Conesville
KLB obs 14 Sep 75
Vic of S. Gilboa, Town of Gilboa
KLB obs 22 Sep 75

Sullivan County

Vic of L Shandelee, Town of Callicoon
P. Wilson 16 Aug 18--NY

(Continued on p. 347)

Polygonum scandens L.
Climbing False Buckwheat



Delaware County

Franklin, Town of Franklin
M. Platt, 1840
McMurdy Hill Brook, 1 1/2 mi n of S. Kortright, Town of Kortright
Smith & Brooks obs 19 Jul 52
W of Cadosia, Town of Hancock
SJS obs 10-11 Aug 55
Margaretville, Town of Middletown
4686 Brooks & Smith 9 Sep 61--NYS
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
4736 Brooks 18 Sep 66--NYS, Brooks
Fraser, Town of Delhi
KLB obs 29 Aug 70
Vic of Downsville, Town of Colchester
KLB obs 11 Sep 74 (specimen checked)
Vic of Delancey, Town of Hamden
KLB obs 7 Sep 75

Polygonum scandens

Vic of Stratton Falls, Town of Roxbury
KLB obs 10 Sep 75

Greene County

Maplecrest, Town of Hunter
Alexandra Dodd 10 Jul 27--NY
3 mi e of Jewett Center, Town of Jewett
6069 Brooks 10 Sep 74--NYS

Ulster County

Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
810 M. Domville 20 Aug 70--Domville
1 1/2 mi se of Pine Hill, Town of Shandaken
KLB obs 21 Jul 74 (specimen checked)

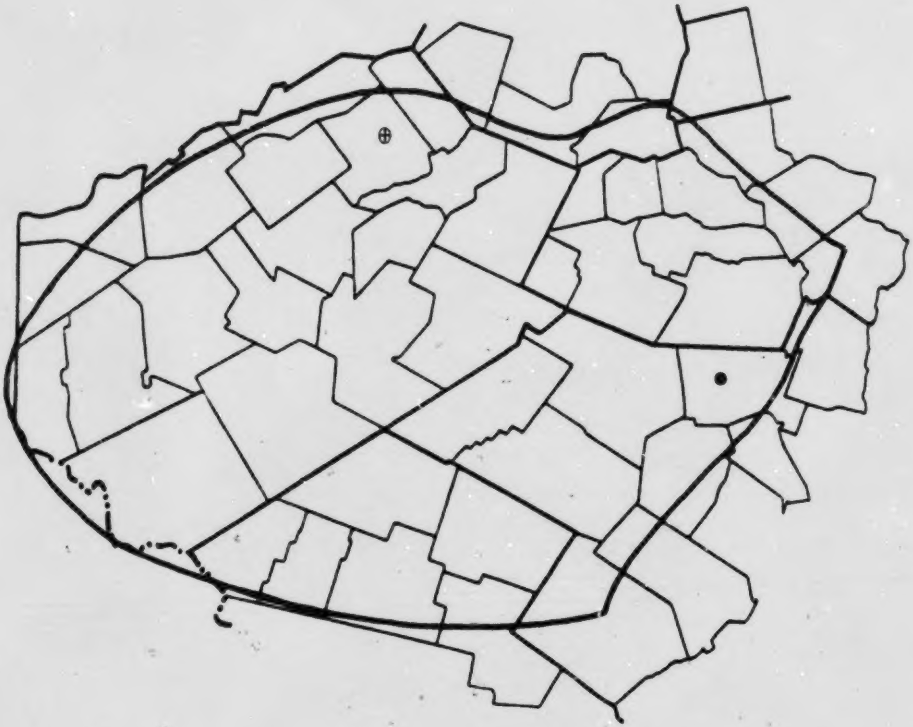
Polygonum sagittatum **(continued from p. 345)**

Youngsville, Town of Callicoon
4565 E. Whitney 29 Jul 35—NYS
Vic of Willowemoc, Town of Neversink
SJS obs 15 Aug 52
E of Long Eddy, Town of Fremont
SJS obs 7 Sep 56
Vic of Roscoe, Town of Rockland
KLB obs 4 Aug 74
Vic of Parksville, Town of Liberty
KLB obs 28 Jul 75

Ulster County

Headwaters of Rondout Creek, Town of Denning
SJS obs 1 Jul 61
Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
KLB & Mary Domville obs 26 Aug 72
Vic of Big Indian, Town of Shandaken
KLB & Paul Huth obs 17 Sep 72
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
KLB & Claire Friedberg obs 18 Jul 73
Vic of Belle Ayre village, Town of Hardenburgh
KLB obs 8 Jul 75
3 mi nw of Tabasco, Town of Rochester
KLB & Paul Huth obs 19 Aug 76
2 mi n of Ulster Heights, Town of Warwarsing
KLB & Paul Huth obs 19 Aug 76

Polygonum tenue Michx.
Slender Knotweed



Ulster County

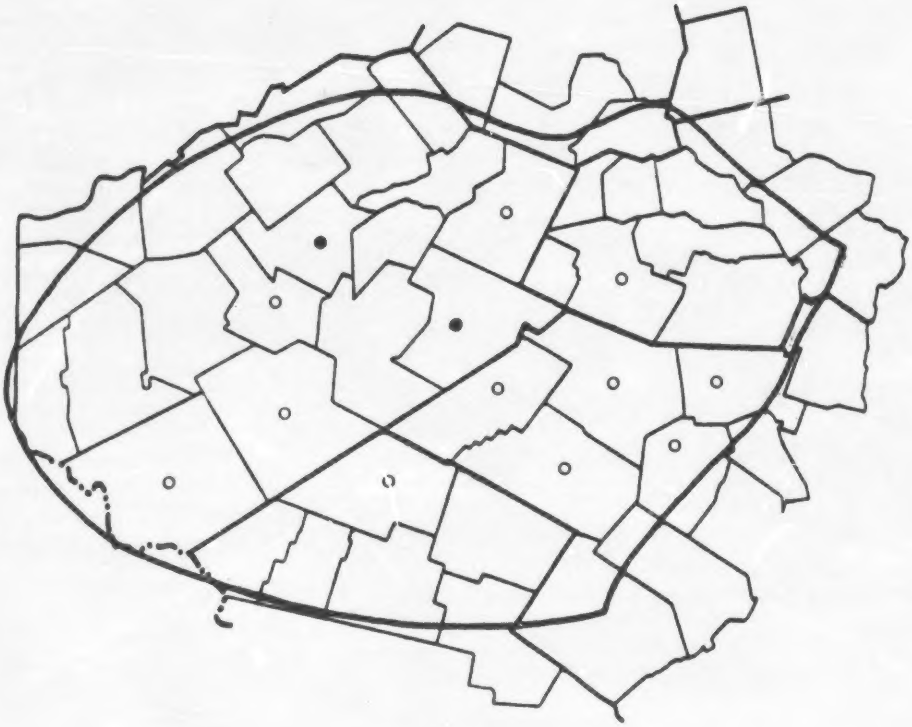
Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
869 M. Domville 19 Sep 70--NYS

Rumex x acutus L. Acute-leaved Dock (⊕)

Delaware County

Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
686 Brooks 26 Jul 51--NYS

Polygonum virginum L.
Jumpseed



Delaware County

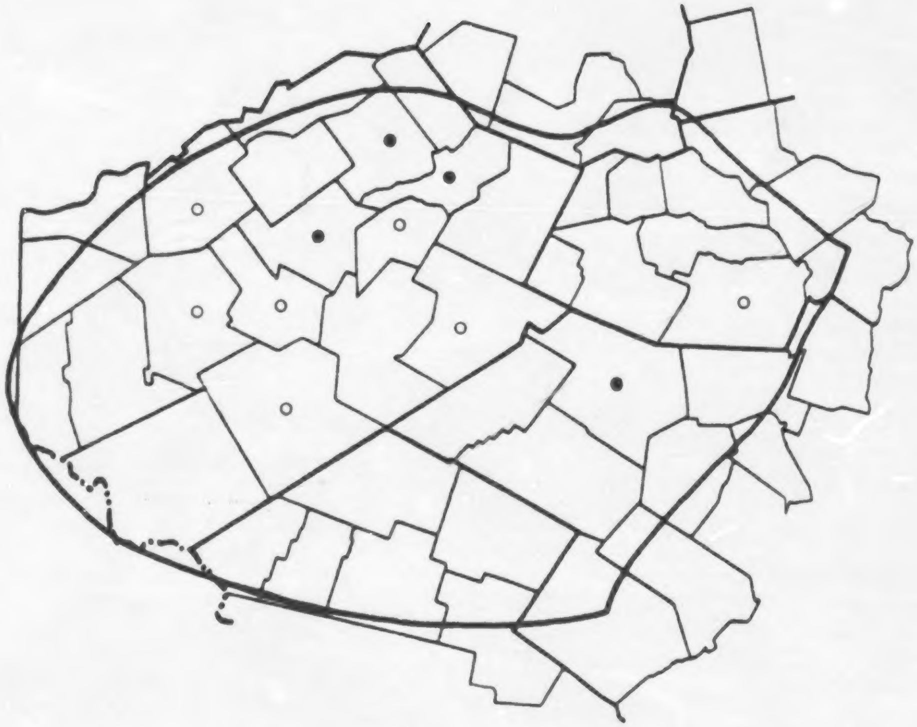
Along Delaware R, 1 mi s of Delhi, Town of Delhi
   1915 Brooks 16 Aug 52--NYS, Brooks
Hancock, Town of Hancock
   SJS obs 17 Jun 54
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
   4729 Brooks 5 Sep 66--NYS, Brooks
3 mi s of Grand Gorge, Town of Roxbury
   KLB obs 17 Sep 73
1 1/2 mi e of Delancey, Town of Hamden
   KLB obs 15 Jun 75

Greene County

2 mi s of West Kill, Town of Lexington
   KLB obs 10 Sep 74

(Continued on p. 362)

Rumex acetosa L.
Garden Sorrel

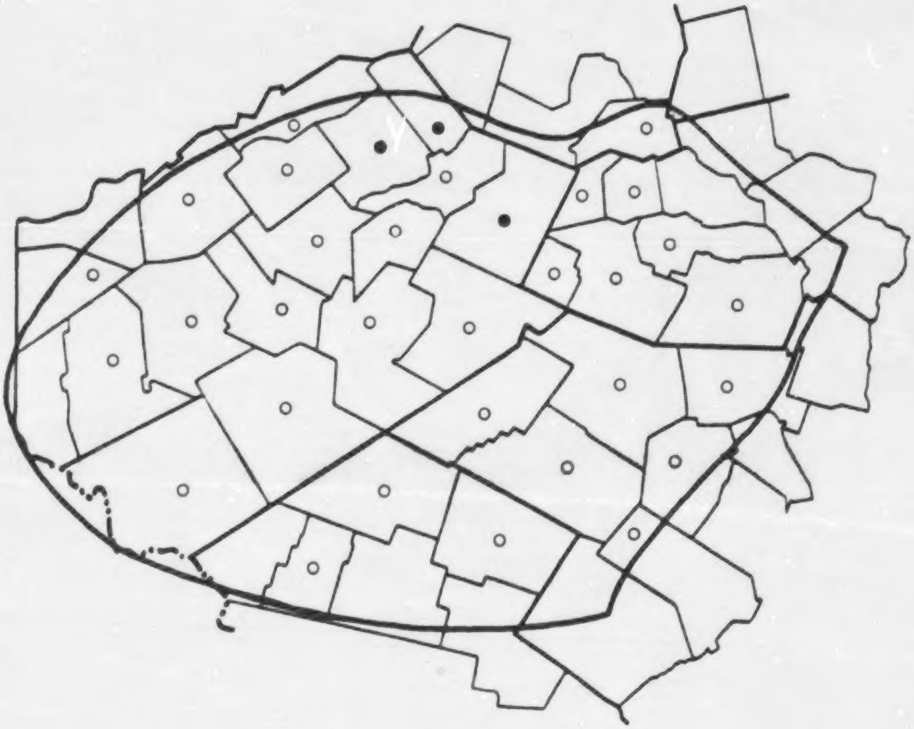


Delaware County

S. Kortright, Town of Stamford
    Ralph H. Rose 30 May 45--NYS
Gerry Estate, 4 mi nw of Andes, Town of Delhi
    1472 Brooks 31 May 52--Brooks
Betty's Brook Rd, 2 1/2 mi n by w of S. Kortright, Town of Kortright
    3020 Brooks 5 Jul 54--Brooks
2 mi sw by s of Odell Lake, Town of Kortright
    3792 Brooks 2 Jul 55--NYS
Old Stone Schoolhouse, 2 1/4 mi sw of Margaretville, Town of Middletown
    T569 & T570 Brooks 12 Jun 71
Vic of Downsville, Town of Colchester
    KLB obs 30 May 74
2 mi n of Bovina Center, Town of Bovina
    KLB obs 24 Jun 74
1 1/2 mi e of Delancey, Town of Hamden
    KLB obs 15 Jun 75

(Continued on p. 355)

Rumex acetosella L.
ssp. angiocarpus (Murb.) Murb.
Sheep Sorrel



Delaware County

Vic of W. Harpersfield, Town of Harpersfield
D. L. Topping 31 May 06--US
Gregorytown, Town of Colchester
3 Brooks 39--Frag; specimen destroyed after verification by SJS
2 mi s of Grand Gorge on Rt 30, Town of Roxbury
128 Brooks & Smith 12 May 51--NYS
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
271 Brooks 23 Jun 51--NYS; 525 Brooks 21 Jul 51--NYS: 2750 Brooks 30 May 54--NYS, Brocks
E of Kilgour Spur, Town of Hancock
SJS obs 17-18 Jun 54
Mt Utsayantha, 1 1/2 mi e by s of Stamford, Town of Stamford
KLB obs 3 Jul 54
Scotch Mt, 3 1/2 mi ne of Delancey, Town of Delhi
KLB obs 12 Jul 54

Rumex acetosella ssp. angiocarpus

Hoff Farm, 2 1/4 mi nw of Bovina Center, Town of Bovina
  KLB obs 14 Jul 54
Farmers Hill, 3 mi e by s of Andes, Town of Andes
  KLB obs 18 Jun 55
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
  KLB obs 10 Jul 59
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
  BW3-20 Brooks 4 Jul 68: T521 Brooks 13 Jun 70
2 1/2 mi e by n of Delancey, Town of Hamden
  KLB obs 14 Jul 73
Emmons Pond, Town of Davenport
  R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]
2 mi s of E. Meredith, Town of Meredith
  KLB obs 24 Jun 74
Strauss Farm, 4 1/2 mi ne of Walton, Town of Walton
  KLB obs 26 Aug 74
Mormon Hollow Rd, 3 mi w of Trout Creek, Town of Masonville
  KLB obs 7 Sep 75
7 mi ne of Deposit, Town of Tompkins
  KLB obs 6 Jul 76

Greene County

1 1/2 mi e of Lexington, Town of Lexington
  KLB obs 19 Jun 73
2 mi n of Halcott Center, Town of Halcott
  KLB obs 25 Jun 73
Devil's Tombstone Campsite, Town of Hunter
  KLB obs 5 Jun 74
2 mi s of Jewett, Town of Jewett
  KLB obs 1 Jul 75
Vic of E. Ashland, Town of Ashland
  KLB obs 8 Jun 76
Prattsville, Town of Prattsville
  KLB obs 8 Jun 76

Schoharie County

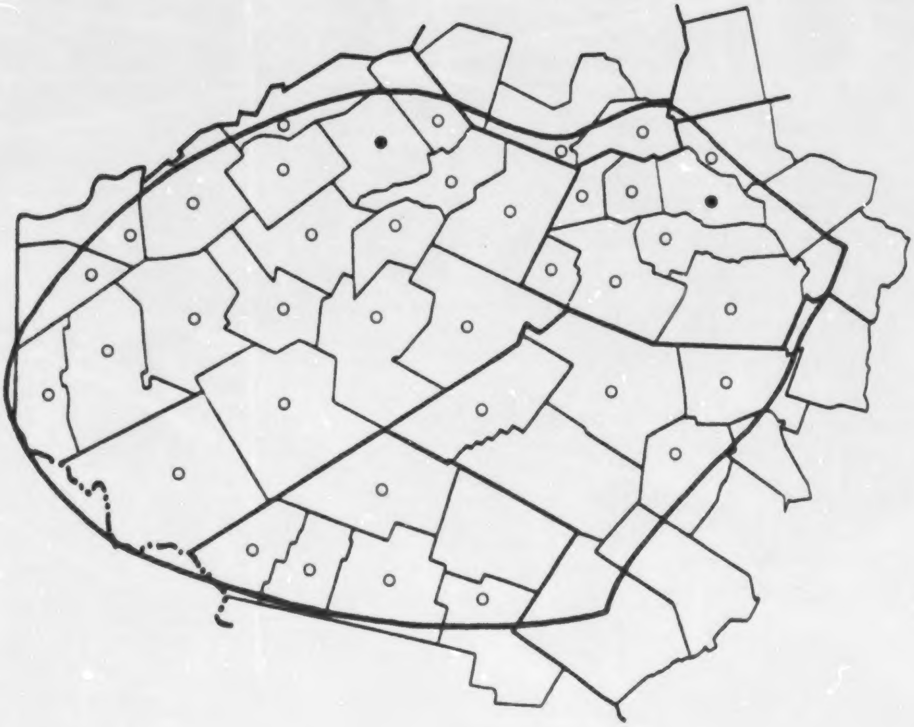
Vic of Manorkill, Town of Conesville
  KLB obs 1 Jul 75

Sullivan County

1 mi sw of Lew Beach, Town of Rockland
  KLB obs 3 Jun 74
Vic of Claryville, Town of Neversink
  KLB obs 11 Jun 74
3 mi s by w of Livingston Manor, Town of Callicoon
  KLB obs 15 Jun 76

(Continued on p. 357)

Rumex crispus L.
Curled Dock



Delaware County

Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
1641 Brooks 10 Jul 52--NYS, Brooks: 4224 Brooks 28 Jul 56--NYS
Mt Utsayantha, 1 1/2 mi e by s of Stamford, Town of Stamford
KLB obs 3 Jul 54
Scotch Mt, 3 1/2 mi ne of Delancey, Town of Delhi
KLB obs 12 Jul 54
Hoff Farm, 2 1/4 mi nw of Bovina Center, Town of Bovina
KLB obs 14 Jul 54
W of Cadosia, Town of Hancock
SJS obs 11 Aug 55
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
KLB obs 10 Jul 59
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
KLB obs 2 Aug 70
2 mi e of Downsville, Town of Colchester
KLB obs 19 Jun 71

Rumex crispus

6 mi s of Andes, Town of Andes
  KLB obs 12 Jun 73 (specimen checked)
Vic of Beerston, Town of Walton
  KLB obs 8 Jul 73
2 mi w by s of Grand Gorge, Town of Roxbury
  KLB obs 30 Jul 73
Emmons Pond, Town of Davenport
  R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]
2 mi s of E. Meredith, Town of Meredith
  KLB obs 24 Jun 74
2 mi e of Hamden, Town of Hamden
  KLB obs 14 Jul 74
Vic of Stilesville, Town of Deposit
  KLB obs 10 Aug 75
7 mi e by n of Deposit, Town of Tompkins
  KLB obs 10 Aug 75
Vic of Sidney Center, Town of Sidney
  KLB obs 7 Sep 75
3 mi n of Hobart, Town of Harpersfield
  KLB obs 27 Jun 76
Vic of E. Masonville, Town of Masonville
  KLB obs 6 Jul 76

Greene County

Windham, Town of Windham
  868 N. Taylor 28-31 Jul 09 at 1700 ft--NY
1 1/2 mi e of Lexington, Town of Lexington
  KLB obs 19 Jun 73
Prattsville, Town of Prattsville
  KLB obs 19 Jun 73
2 mi n of Halcott Center, Town of Halcott
  KLB obs 25 Jun 73
Vic of Lanesville, Town of Hunter
  KLB obs 18 Jul 73
3 mi e of Jewett Center, Town of Jewett
  KLB obs 10 Sep 74
Vic of E. Ashland, Town of Ashland
  KLB obs 4 Jul 75
Vic of Durso Corner, Town of Durham
  KLB obs 26 Sep 75

Schoharie County

Vic of Conesville, Town of Conesville
  KLB obs 1 Jul 75
Vic of S. Gilboa, Town of Gilboa
  KLB obs 22 Sep 75

Rumex crispus

Sullivan County

Vic of Roscoe, Town of Rockland
KLB obs 18 Jun 74
Vic of Lakewood, Town of Fremont
KLB obs 21 Jun 75
2 mi n of N. Branch, Town of Callicoon
KLB obs 21 Jun 75
Vic of Liberty, Town of Liberty
KLB obs 28 Jul 75
3 mi n of Woodbourne, Town of Fallsburg
KLB obs 2 Aug 76

Ulster County

Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
M. Domville [Plants of Wilson State Park, 26 Aug 72]
Vic of Pine Hill, Town of Shandaken
KLB obs 30 May 73
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
KLB & Claire Friedberg obs 5 Jun 74
1 mi ne of Dry Brook, Town of Hardenburgh
KLB obs 1 Jun 75

Rumex acetosa (continued from p. 350)

Storey Place, 6 mi se of Franklin, Town of Franklin
KLB obs 20 Jun 76
4 mi sw of Walton, Town of Walton
KLB obs 6 Jul 76

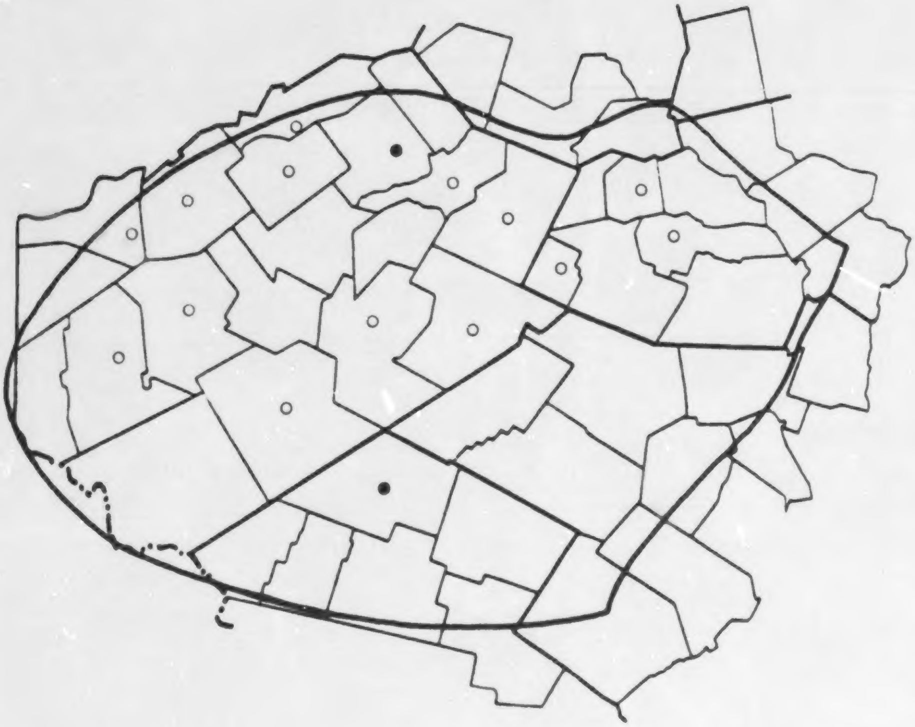
Greene County

Devil's Tombstone Campsite, Town of Hunter
KLB obs 5 Jun 74

Ulster County

Vic of Pine Hill, Town of Shandaken
122 M. Domville 8 Jun 66--NYS

Rumex longifolius Lam.
Yard Dock



Delaware County

Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
1638 Brooks 10 Jul 52--NYS, Brooks
Kortright Center, Town of Kortright
4362 Brooks 9 Jul 58--NYS
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
KLB obs 10 Jul 59
Rosa Farm, 1 mi s of Margaretville, Town of Middletown
KLB obs 2 Aug 70
1 1/2 mi s of Andes, Town of Andes
KLB obs 14 Jul 73
2 mi e by s of Davenport Center, Town of Davenport
KLB obs 24 Jun 74
2 mi s of E. Meredith, Town of Meredith
KLB obs 24 Jun 74
2 mi sw of Grand Gorge, Town of Roxbury
KLB obs 4 Jul 74

Rumex longifolius

6 mi se of Downsville, Town of Colchester
KLB obs 21 Jun 75

Greene County

Vic of Beaches Corners, Town of Jewett
KLB obs 4 Jul 75
2 mi n by e of Ashland, Town of Ashland
KLB obs 4 Jul 75
Steinfeld Place, 3 mi n of Halcott Center, Town of Halcott
KLB obs 26 Jul 75

Sullivan County

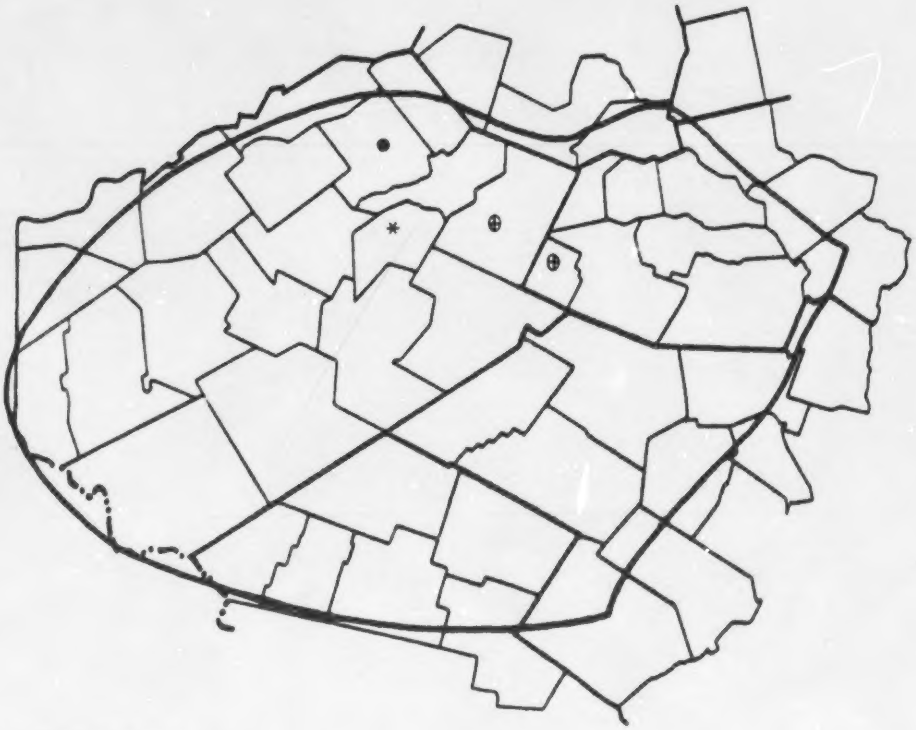
Vic of Roscoe, Town of Rockland
6019 Brooks 18 Jun 74--NYS

Rumex acetosella angiocarpus (continued from p. 352)

Ulster County

Overlook Mt, Town of Woodstock
KLB & Mary Domville obs 12 Jul 70
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
KLB & Claire Friedberg obs 18 Jul 73
Vic of Hardenburgh, Town of Hardenburgh
KLB obs 14 May 74
Vic of Frost Valley Camp, Town of Denning
KLB obs 11 Jun 74
Summit of Slide Mt, Town of Shandaken
KLB & Paul Huth obs 22 Sep 74
3 mi nw of Tabasco, Town of Rochester
KLB & Paul Huth obs 19 Aug 76

Rumex maritimus L.
var. fueginus (Phil.) Dusen.
Golden Dock



Delaware County

Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
913 Brooks 22 Sep 51--NYS

Rumex patientia L. Patience Dock (⊕), *

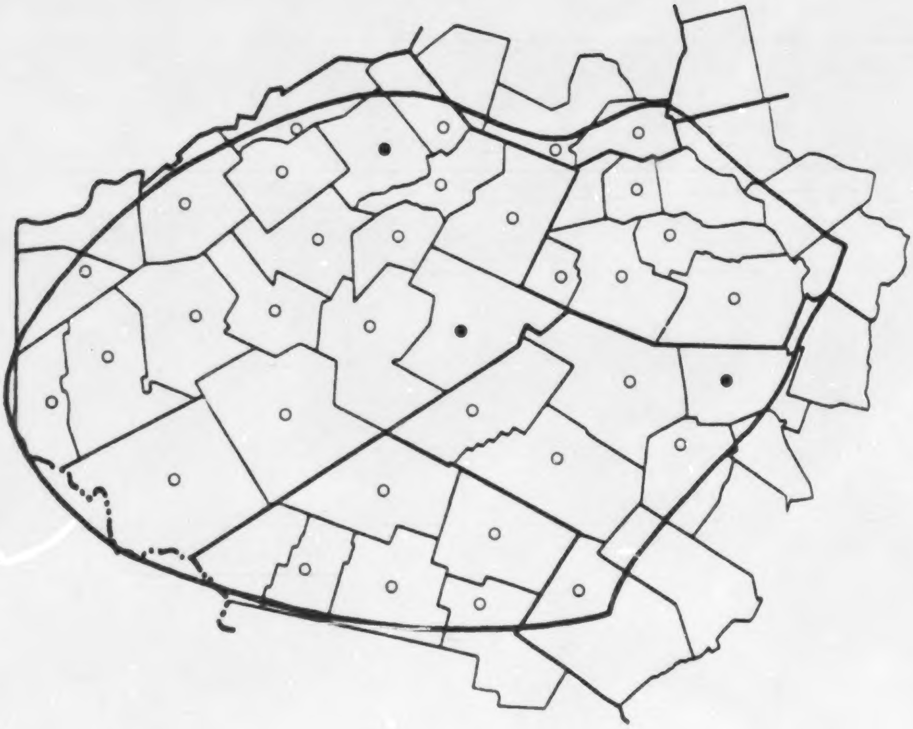
Delaware County

2 1/2 mi se of Roxbury, Town of Roxbury
6233 Brooks 18 Jul 76--NYS, Brooks

Greene County

Steinfeld Place, 3 mi n of Halcott Center, Town of Halcott
6159 Brooks 26 Jul 75--NYS

Rumex obtusifolius L.
Bitter Dock



Delaware County

Arkville, Town of Middletown
P. Wilson 14 Jul 15--NY; P. Wilson 18 Jul 15--NY
Brookdale Farm, 3 mi s by w of W. Harpersfield, Town of Kortright
685 Brooks 26 Jul 51--Brooks; 3079 Brooks 10 Jul 54--NYS; 3088 Brooks 10 Jul 54--NYS: 3200 Brooks 8 Aug 54--NYS; 4225 Brooks 28 Jul 56--NYS
Davenport Center, Town of Davenport
Smith & Brooks obs 7 Aug 54
Kilgour Spur, Town of Hancock
SJS obs 10 Aug 55
Merrill Farm, 2 mi s of Treadwell, Town of Franklin
KLB obs 10 Jul 59
Delhi, Town of Delhi
KLB obs 5 Sep 59
2 mi e of Downsville, Town of Colchester
KLB obs 19 Jun 71

Rumex obtusifolius

Big Pond Rd, 14 mi s by e of Andes, Town of Andes
KLB obs 6 Jun 73
Emmons Pond, Town of Davenport
R. Vitkus, A Floris. Descr. of Emmons' Pond Preserve [29 Aug 73]
Roses Brook Rd, 3 mi se of S. Kortright, Town of Stamford
KLB obs 16 May 74
Vic of Bovina Center, Town of Bovina
KLB obs 24 Jun 74
2 mi s of E. Meredith, Town of Meredith
KLB obs 24 Jun 74
1 1/2 mi w of Vega, Town of Roxbury
KLB obs 27 Jun 74
Vic of Delancey, Town of Hamden
KLB obs 28 Jul 74
Vic of Launt Pond, Town of Walton
KLB obs 28 Jul 74
3 mi n of Hobart, Town of Harpersfield
KLB obs 21 May 75
Vic of Apex, Town of Tompkins
KLB obs 27 Aug 75
Vic of Silver Lake, Town of Deposit
KLB obs 31 Aug 75
3 mi nw of Trout Creek, Town of Masonville
KLB obs 7 Sep 75

Greene County

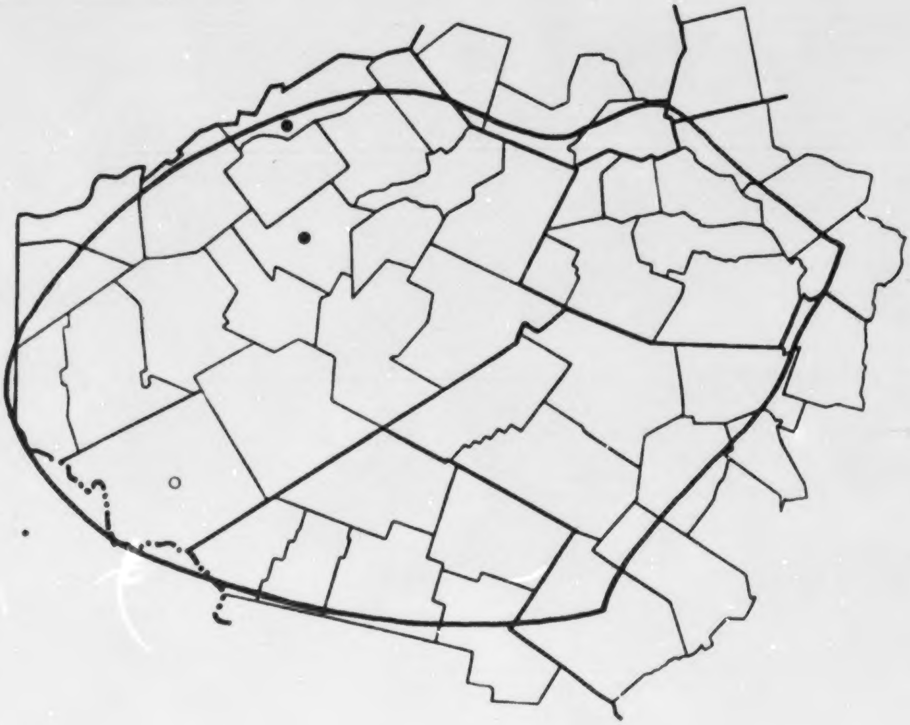
2 mi n of Halcott Center, Town of Halcott
KLB obs 25 Jun 73
Vic of Lanesville, Town of Hunter
KLB obs 18 Jul 73
West Kill Brook, 4 mi e of West Kill, Town of Lexington
KLB obs 13 Sep 73
2 mi s of Jewett, Town of Jewett
KLB obs 1 Jul 75
2 mi sw of Ashland, Town of Ashland
KLB obs 1 Jul 75

Sullivan County

Vic of Claryville, Town of Neversink
KLB obs 11 Jun 74
Vic of Lew Beach, Town of Rockland
KLB obs 18 Jun 74
2 mi n of N. Branch, Town of Callicoon
KLB obs 21 Jun 75
Vic of Parksville, Town of Liberty
KLB obs 28 Jul 75
3 mi n of Woodbourne, Town of Fallsburg
KLB obs 2 Aug 76

(Continued on p. 362)

Rumex triangulivalvis (Danser) Rech. f.
Willow-leaved Dock



Delaware County

Kilgour Spur, Town of Hancock
 SJS obs 17-18 Jun 54
Davenport Center, Town of Davenport
 3185 Brooks & Smith 7 Aug 54--Brooks, NYS
Fraser, Town of Delhi
 4837 Brooks 1 Sep 68--Brooks, NYS

Polygonum virginianum (continued from p. 349)

Sullivan County

Beaverkill Campsite, Town of Rockland
KLB obs 20 Aug 75

Ulster County

Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
KLB obs 26 Aug 72
Vic of Big Indian, Town of Shandaken
KLB & Paul Huth obs 17 Sep 72
Vic of Bull Run, Town of Denning
KLB obs 10 Jun 75
2 mi ne of Lew Beach, Town of Hardenburgh
KLB obs 20 Aug 75

Rumex obtusifolius (continued from p. 360)

Schoharie County

Vic of W. Conesville, Town of Conesville
KLB obs 8 Jun 76
1 mi se of Gilboa, Town of Gilboa
KLB obs 17 Aug 76

Ulster County

Overlook Mt, Town of Woodstock
KLB & Mary Domville obs 12 Jul 70
Wilson State Park, 3 mi sw of Bearsville, Town of Woodstock
832 M. Domville 27 Aug 70--Domville
Huth Place, 1 1/2 mi s of Pine Hill, Town of Shandaken
KLB & Paul Huth obs 17 Sep 72
Friedberg Place, 1 mi sw of Boiceville, Town of Olive
KLB & Claire Friedberg obs 18 Jul 73
Vic of Hardenburgh, Town of Hardenburgh
KLB obs 14 May 74
Vic of Frost Valley Camp, Town of Denning
KLB obs 11 Jun 74
2 mi n of Ulster Heights, Town of Warwarsing
KLB & Paul Huth obs 19 Aug 76

ADDENDA

For a number of reasons, which at the moment are not particularly relevant, this section of A Catskill Flora was prepared for review ahead of the two sections that have already been published. For equally good reasons publication of this section was delayed for three years. The body of the Appendix therefore contains distribution records through 1976 only. It was a comparatively simple matter to add additional township records for 1977, 1978, and 1979 to the distribution maps, but to cite in chronological order these collections and observations in the body of the Appendix would have entailed retyping over 100 pages of carefully prepared camera copy. It was therefore decided that the easiest way to bring the distribution records up to date was to cite the observations and collections for those three years in this section. The distribution maps are up to date as they now stand, but supporting data gathered during the years 1977, 1978, and 1979 follow.

POPULUS x GILEADENSIS

Ulster County

Vic of Boiceville, Town of Olive
   KLB obs 30 Jun 78
Vic of Big Indian, Town of Shandaken
   KLB obs 19 Jul 78
Vic of Willow, Town of Woodstock
   6335 Brooks & Phil Caswell 9 May 79--NYS

POPULUS GRANDIDENTATA

Delaware County

Vic of Sidney Center, Town of Sidney
   KLB & Phil Caswell obs 21 Jun 79
Vic of E. Masonville, Town of Masonville
   KLB & Phil Caswell obs 21 Jun 79

POPULUS x SMITHII

Delaware County

Wake Robin, Vic of Roxbury, Town of Roxbury
   6311 Brooks, Kathy Emerson & Phil Caswell 4 Sep 78--NYS, Brooks

SALIX DEPRESSA

Delaware County

Houghtaling Hollow Rd, 2 mi nw of Meridale, Town of Meredith
   KLB, Kathy Emerson & Phil Caswell obs 23 Aug 78

Vic of Apex, Town of Tompkins
   KLB, Kathy Emerson & Phil Caswell obs 30 Aug 78

SALIX DISCOLOR

Delaware County

Clark Place, 4 1/2 mi s of E. Meredith, Town of Meredith
   KLB & Mrs. Lynn Clark obs 3 Jun 78
Post Place, 2 1/2 mi s of Stamford, Town of Stamford
   KLB & Elisabeth Post obs 19 Jun 78
Vic of Lordville, Town of Hancock
   KLB, Kathy Emerson & Phil Caswell obs 30 Aug 78

SALIX FRAGILIS

Delaware County

Vic of Trout Creek, Town of Tompkins
   KLB & Phil Caswell obs 21 Jun 79

SALIX NIGRA

Delaware County

Vic of Downsville, Town of Colchester
   KLB obs 25 Jun 78

Sullivan County

Vic of Long Eddy, Town of Fremont
   KLB & Phil Caswell obs 14 Sep 78

SALIX RIGIDA

Delaware County

Vic of Apex, Town of Tompkins
   KLB, Kathy Emerson & Phil Caswell obs 30 Aug 78
Merrill Farm, 3 mi s of Treadwell, Town of Franklin
   KLB obs 22 May 79

Sullivan County

Vic of Long Eddy, Town of Fremont
   KLB & Phil Caswell obs 14 Sep 78

Ulster County

Vic of Boiceville, Town of Olive
   KLB obs 30 Jun 78

SALIX SERICEA

Delaware County

Delancey, Town of Hamden
   KLB obs 22 May 79
Vic of Sidney Center, Town of Sidney
   KLB & Phil Caswell obs 21 Jun 79

Sullivan County

Vic of Long Eddy, Town of Fremont
   KLB & Phil Caswell obs 14 Sep 78

CARYA GLABRA

Sullivan County

Vic of Long Eddy, Town of Fremont
   KLB & Phil Caswell obs 14 Sep 78

CARYA OVATA

Sullivan County

Vic of Long Eddy, Town of Fremont
   KLB & Phil Caswell obs 14 Sep 78

BETULA ALLEGHENIENSIS

Delaware County

Vic of Apex, Town of Tompkins
   KLB, Kathy Emerson & Phil Caswell obs 30 Aug 78

BETULA LENTA

Greene County

Prattsville, Town of Prattsville
   KLB obs 2 Jun 79

Ulster County

Vic of Willow, Town of Woodstock
   KLB & Phil Caswell obs 16 May 79

BETULA POPULIFOLIA

Delaware County

Vic of E. Masonville, Town of Masonville
   KLB & Phil Caswell obs 21 Jun 79

CARPINUS CAROLINIANA

Delaware County

Vic of Apex, Town of Tompkins
KLB, Kathy Emerson & Phil Caswell obs 30 Aug 78

CORYLUS CORNUTA

Delaware County

Vic of Roxbury, Town of Roxbury
Phil Caswell obs, personal communication 10 Dec 78

OSTRYA VIRGINIANA

Delaware County

Vic of Apex, Town of Tompkins
KLB, Kathy Emerson & Phil Caswell obs 30 Aug 78

CASTANEA DENTATA

Delaware County

4 mi e of Delhi, Town of Delhi
Howard Cameron specimen 18 Oct 77 checked by KLB

Sullivan County

Vic of Long Eddy, Town of Fremont
KLB & Phil Caswell obs 14 Sep 78

QUERCUS ALBA

Delaware County

Vic of Lordville, Town of Hancock
6309 Brooks, Kathy Emerson & Phil Caswell 30 Aug 78--NYS

QUERCUS PRINUS

Sullivan County

Vic of Long Eddy, Town of Fremont
KLB & Phil Caswell obs 14 Sep 78

HUMULUS LUPULUS

Delaware County

Arkville, Town of Middletown
KLB obs 17 Aug 78

PILEA PUMILA

Delaware County

3/4 mi s by w of Davenport Center, Town of Davenport
  KLB obs 5 Sep 78
Post Place, 2 1/2 mi s of Stamford, Town of Stamford
  KLB & Elisabeth Post obs 11 Sep 78
Vic of Roxbury, Town of Roxbury
  Phil Caswell obs, personal communication 10 Dec 78

URTICA DIOICA SSP. GRACILIS

Delaware County

Vic of Trout Creek, Town of Tompkins
  KLB & Phil Caswell obs 21 Jun 79

Sullivan County

Vic of Long Eddy, Town of Fremont
  KLB & Phil Caswell obs 14 Sep 78

ASARUM CANADENSE

Delaware County

Clark Place, 4 1/2 mi s of E. Meredith, Town of Meredith
  KLB & Mrs. Lynn Clark obs 3 Jun 78

Ulster County

1 mi s of Dry Brook, Town of Hardenburgh
  KLB & Phil Caswell obs 19 May 79

POLYGONUM ARIFOLIUM

Delaware County

Vic of Apex, Town of Tompkins
  KLB, Kathy Emerson & Phil Caswell obs 30 Aug 78

POLYGONUM CESPITOSUM VAR. LONGISETUM

Sullivan County

Vic of Long Eddy, Town of Fremont
  6324 Brooks & Phil Caswell 14 Sep 78--NYS

POLYGONUM CILINODE

Delaware County

Coe Hill Rd, 3 mi nw of Meridale, Town of Meredith
KLB, Kathy Emerson & Phil Caswell obs 23 Aug 78
Merrill Farm, 3 mi s of Treadwell, Town of Franklin
KLB obs 22 May 79

POLYGONUM CUSPIDATUM

Ulster County

Vic of Willow, Town of Woodstock
KLB obs 6 Sep 78

POLYGONUM HYDROPIPER

Delaware County

Vic of Emmons Bog, Town of Davenport
KLB, Kathy Emerson & Phil Caswell obs 23 Aug 78
3 mi n of Bovina Center, Town of Bovina
KLB obs 11 Sep 78
Post Place, 2 1/2 mi s of Stamford, Town of Stamford
KLB & Elisabeth Post obs 11 Sep 78

Sullivan County

Vic of Long Eddy, Town of Fremont
KLB & Phil Caswell obs 14 Sep 78

Ulster County

Trail to Balsam Mt, Town of Hardenburgh
KLB obs 27 Aug 77

POLYGONUM NEPALENSE

Sullivan County

Vic of Long Eddy, Town of Fremont
KLB & Phil Caswell obs 14 Sep 78

POLYGONUM PENSYLVANICUM

Sullivan County

Vic of Long Eddy, Town of Fremont
KLB & Phil Caswell obs 14 Sep 78

POLYGONUM PERSICARIA

Sullivan County

Vic of Long Eddy, Town of Fremont
KLB & Phil Caswell obs 14 Sep 78

POLYGONUM SCANDENS

Delaware County

Vic of Apex, Town of Tompkins
KLB, Kathy Emerson & Phil Caswell obs 30 Aug 78

POLYGONUM VIRGINIANUM

Delaware County

Vic of Downsville, Town of Colchester
KLB obs 25 Jun 78

RUMEX CRISPUS

Delaware County

Bettys Brook Rd, 1 mi nw of S. Kortright, Town of Kortright
6287 Brooks 2 Jul 78--NYS

RUMEX LONGIFOLIUS

Delaware County

Roses Brook Rd, 1 mi s of S. Kortright, Town of Stamford
KLB obs 2 Jul 78
Vic of Northfield, Town of Walton
KLB & Phil Caswell obs 21 Jun 79
Vic of Sidney Center, Town of Sidney
KLB & Phil Caswell obs 21 Jun 79
Vic of Trout Creek, Town of Tompkins
KLB & Phil Caswell obs 21 Jun 79

RUMEX PATIENTIA

Delaware County

2 mi n of Bovina Center, Town of Bovina
KLB obs 11 Sep 78

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